

From: [Jo Macpherson](#)
To: [Ken Hughey](#)
Subject: RE: Document Link: Waitaki Final HEP Bottom Line - IN CONFIDENCE
Date: Monday, 6 June 2022 4:22:02 pm
Attachments: [Waitaki Final HEP Bottom Line - DOC-7039324.docx](#)

Here is your attachment Ken..

Cheers Jo

From: Ken Hughey <khughey@doc.govt.nz>
Sent: Monday, 6 June 2022 1:56 pm
To: Jo Macpherson <jmacpherson@doc.govt.nz>
Subject: FW: Document Link: Waitaki Final HEP Bottom Line - IN CONFIDENCE

Jo

Can you please open below in DOC-CM and send to me as an attachment?

I'm planning to summarise this opinion, the mitigation package options and existing investments in about a 1-2 pager for you and Mike for 5.30 tomorrow. Just as a starter for our 530pm mtg

Thanks Ken

From: Herb Familton <hfamilton@doc.govt.nz>
Sent: Thursday, 2 June 2022 5:15 pm
To: Ken Hughey <khughey@doc.govt.nz>; Karina Morrow <kmorrow@doc.govt.nz>
Cc: Susan Newell <snewell@doc.govt.nz>
Subject: Document Link: Waitaki Final HEP Bottom Line

Waitaki Final HEP Bottom Line

https://doccm.doc.govt.nz:443/wcc/faces/wccdoc?_afDocName=DOC-7039324

I've inserted Deans latest figure and used reserve bank NZ inflation calculator.

Herb

From: [Richard Maloney](#)
To: [Ken Hughey](#)
Cc: [Dean Nelson](#)
Subject: Copy of Approximate current costs Waitaki catchment June 2022_ver2.xlsx
Date: Friday, 3 June 2022 3:38:47 pm
Attachments: [Copy of Approximate current costs Waitaki catchment June 2022_ver2.xlsx](#)

Latest version

Released under Official Information Act

Sum of Per annum		
Work area	Work type	Total
Freshwater work	Research and management	106,000
Freshwater work Total		106,000
Lower Waitaki	Weeds	910,000
Lower Waitaki Total		910,000
Terrestrial Science work	Research and management	77,000
Terrestrial Science work Total		77,000
Upper river catchment	Biosecurity funding	20,000
	Zone committee funding	104,000
	Outcome monitoring	9,912
	Pest bird control	57,957
	Pest control - possum	112,805
	Predator Control avian	30,594
	Predator Control mammalian	241,532
	Rabbit fencing	84,825
	Rabbits	738,452
	Research and management	215,000
	Species management - Braided riverbed bird surveys	5,516
	Species management - invertebrates	8,065
	Species management - kaki	242,466
	Species management - lizards	6,716
	Species management - threatened and ephemeral plants	13,020
	Species management - threatened fish	23,200
	Staff costs not covered elsewhere	215,730
	Tenure review	7,128,000
	Weeds	1,102,635
Upper river catchment Total		10,360,425
Grand Total		11,453,425

Work area	Work type	Work	Per annum	Significant recent one-offs	Notes
Upper river catchment	Weeds	river weed work J4N funded via	\$ 830,914		Zones 4 and 3A
Upper river catchment	Weeds	DOC	\$ 29,781		
Upper river catchment	Weeds		\$ 48,940		Tekapo and Dobson
Upper river catchment	Weeds	separate to above	\$ 15,000		Dobson
Upper river catchment	Rabbits	Pukaki Tasman Ahuriri Godley riverbeds	\$ 610 584		
Upper river catchment	Rabbits	DOC in Tasman riverbed	\$ 127,868		
Upper river catchment	Staff costs not covered elsewhere	project	\$ 215,730		
Upper river catchment	Species management - kaki	Kaki management	\$ 242,466		
Upper river catchment	Species management - Braided riverbed bird surveys	Tasman Dobson Hakataramea	\$ 5 516		
Upper river catchment	Species management - lizards	Lizard monitoring -	\$ 6,716		Protected by predator control
Upper river catchment	Species management - threatened fish	Macrophyte control, trout barrier maintenance and monitoring	\$ 23,200		Includes some staff time for trout removal in Fork Stream
Upper river catchment	Species management - invertebrates	Grasshopper surveys and monitoring	\$ 8,065		
Upper river catchment	Species management - threatened and ephemeral plants	Plant surveys, seeding and germination trials, monitoring and survey	\$ 13,020		
Upper river catchment	Predator Control mammalian	Various species via	\$ 30,119		Quite a bit missing out of here
Upper river catchment	Predator Control mammalian	Various species via DOC	\$ 151,413	\$92,000	Huxley Hopkins for traps
Upper river catchment	Predator Control mammalian	Various species separate to above	\$ 60,000		Dobson, trap costs not available
Upper river catchment	Pest control - possum	Possum control Huxley Hopkins	\$ 112 805		
Upper river catchment	Predator Control avian	black-backed gull control	\$ 30,594		
Upper river catchment	Pest bird control	Canada goose control	\$ 57,957		
Upper river catchment	Outcome monitoring	BFT - Tasman predator control	\$ 9,912		
Upper river catchment	Research and management	Tier monitoring site Tasman Rv	\$ 15,000		
Upper river catchment	Research and management	DOC Uni Predator fence insects	\$ 10 000	\$130 000	one-off was recent fence build
Upper river catchment	Research and management	DOC/Uni River dynamics research Cass	\$ 110,000		includes \$10k DOC support, University in-kind and scholarships
Upper river catchment	Research and management	DOC grasshopper and weta field and advice	\$ 20,000		TSU time
Upper river catchment	Research and management	DOC hedgehog impacts on invertebrate/lizard research	\$ 60 000		Calculated as 40% of total project costs (4 of 6 sites for invertebrates, 2 of 6 sites for lizards and 2 of 6 sites for hedgehog trapping methods)
Upper river catchment	Weeds	Weeds and river works operation budget?	\$ 178,000		Lower Waitaki and Tekapo
Upper river catchment	Rabbit fencing	DOC/farmer River fence maintainence - Tekapo, Pukaki, Ohau	\$ 84,825		
Upper river catchment	Zone committee funding	Fencing and other river/wetland projects	\$ 104,000		Possible overlap with weed work?
Upper river catchment	Biosecurity funding	Weed control	\$ 20,000		
Upper river catchment	Tenure review	DOC tenure review wetland and riverbed purchases (eg Cass, Ahuriri riverbeds,Mt Gerald wetland)	\$ 7,128,000		Crown contribution estimate for the review wetlands and river areas
Lower Waitaki	Weeds	Meridian contribution to work	\$ 375,000		Approx split from Jeff Page email 11 April
Lower Waitaki	Weeds	weed control + mechanical works	\$ 375,000		Approx split from Jeff Page email 1 April
Lower Waitaki	Weeds	Lower waitaki Geraldine ops team	\$ 70,000		
Lower Waitaki	Weeds	Lower Waitaki ops budget for nga awa work going forward	\$ 90,000		
Freshwater work	Reseach and management	Nga Awa Waitaki river restoration report with costings		\$ 50,000.00	
Freshwater work	Reseach and management	Nga Awa Waitaki R land encroachment study (from 2019/20)		\$ 60,000.00	ouple of years ago but still a very relevant piece of work/cost
Freshwater work	Reseach and management	Nga Awa staff time: 0.5FTE Snr Ranger, 0.3FTE C Band and 0.2FTE Tech Advisor	\$ 100,000		
Freshwater work	Reseach and management	Nga Awa work on sediment movment in Rangitāt - applicable to all braided rivers pro rated (1/4th)		\$ 5,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$100k. Proportioned as 1 out of 4 doc regions work is applicable too
Freshwater work	Reseach and management	Migatory Fish programme - guidance on Inanga monitoring pro rata (1/9th)		\$ 2,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$20k. Proportioned as 1 out of 9 doc regions work is applicable too
Freshwater work	Reseach and management	Migatory Fish programme - kanakana larval fishing methods pro rata (1/9th)		\$ 2,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$15k. Proportioned as 1 out of 9 doc regions work is applicable too
Freshwater work	Reseach and management	Migratory fish programme - glass eel reseach work pro rata (1/9th)		\$ 3,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost \$30k. Proportioned as 1 out of 9 doc regions work is applicable too
Freshwater work	Reseach and management	Migatory fish programme - NIWA report on eel trap and transfer pro rata (1/7th)		\$ 3,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost \$30k Proportioned as 1 out of 7 doc regions work is applicable too
Freshwater work	Reseach and management	CRESP programme - reduced flow scenarios with trout and non migratory glaxias reseach pro rata (1/2)		\$ 30,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost \$60k Proportioned as 1 out of 2 doc regions work is applicable too
Freshwater work	Reseach and management	Freshwater Biosecurity programme support to check clean dry - pro rata (1/9th)	\$ 6,000		work that will support nga awa restoration at Waitaki and other rivers. Total cost \$50k Proportioned as 1 out of 9 doc regions work is applicable too
Terrestrial Science work	Reseach and management	Technical Support for Waitaki River (Col etc)	\$ 15 000		
Terrestrial Science work	Reseach and management	Woody vegetation restoration on Eastern South Island limestone*	\$ 30,000		*These projects are on limestone ecosystems within the Waitaki Valley
Terrestrial Science work	Reseach and management	Control and influence of invasive spreading grasses on native plants	\$ 7,000		
Terrestrial Science work	Reseach and management	Rare calcicolous plant propagation and translocation; and Pollinators of rare calcicolous plants: diversity and efficiency*	\$ 10,000		
Terrestrial Science work	Reseach and management	Threatened Plant Monitoring in the Waitaki*	\$ 15,000		
Total cost (directs), excludes overheads, indirects and contingency			\$ 11,453,425	\$ 397,000	

Work type	Work	Per annum	Significant recent one-offs	Notes
Weed management	PRR	\$ 158,614	\$ 95,337	Zones 4, 3A, 3B, 2
Research and management	Tern Island - PRR	\$ 16,048		
Research and management	Lizard monitoring - PRR	\$ 6,304		Protected by predator control
Research and management	Various species PRR	\$ 152,663	\$ 20,000	Tasman, Tern Island
Research and management	PRR black-backed gull control	\$ 24,447		
Research and management	DOC/Uni/PRR black fronted tern movements research	\$ 100,000		
Research and management	DOC/PRR River terr invertebrate sampling	\$ 50,000		
Research and management	DOC/PRR/██████ Tu Te Rakiwhanoa Mackenzie rivers invertebrate refence collection work	\$ 30,000		
PRR approx total		\$ 538,076	\$ 115,337	

Glentanner east of road	461
Mt Cook station Jollie fan + TL river flats of tasman	400
Mt Gerald wetland	749
Godley Peaks TL above Sutherlands hut	100
Lower Cass Rv bed	92. Cant get the bit that is due to come out soon.
Ben Avon pond area down to east branch (river flats/swamps outside of BenAvon reserve)	123
Birchwood swamp etc on Birchwood station	713
Ahuriri River at Longslip	100
Probably something on Huxley Gorge station at temple stream area?	576
Also tarn Brae	164
9-Scientific Reserve The Wolds	150
11-Pukaki Kettleholes	31
15-Wairepo Kettleholes	400
18-Lower Ahuriri Riverbed/CA	200
19-Tara Hill Ponds	85
	4752

ha	4752
Approx cost per ha	\$1,500
Total contribution	\$7,128,000

Released under Official Information Act

From: [Dean Nelson](#)
To: [Ken Hughey](#)
Cc: [Richard Maloney](#)
Subject: RE: Ken's view of the world - 30 May 2022
Date: Friday, 3 June 2022 2:53:58 pm
Attachments: [Approximate current costs Waitaki catchment June 2022.xlsx](#)

Right guys, here is the latest effort at bring the two together. Ursula is just back but due to finish also so I have done a really rough estimate on most of those areas in your email Richard. You will need to get the areas for the other ones on the PowerPoint to add in. I need to cut and run sorry.

Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>
Sent: Friday, 3 June 2022 10:37 am
To: Dean Nelson <dnelson@doc.govt.nz>
Cc: Richard Maloney <rmaloney@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

This is great Dean – is there a simple way to bring the two SSs together into something sort of higher level? It might be one sheet covers whole river investments – cross categories – woody weeds, predators, ... by zone or even by upper and lower river and by agency. Just something I can paint that bigger picture with but then with this material behind it. See you shortly – been a hectic morning so far.

Ken

From: Dean Nelson <dnelson@doc.govt.nz>
Sent: Thursday, 2 June 2022 4:59 pm
To: Ken Hughey <khughey@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

Right Ken, I have added a few extra things in – [REDACTED] predator control in Ohau Forests, also possum control in the same areas. I have tried to add a bit of vehicle costs into things and there is still a bit of weed work to come – put as anticipated weed control. PRR total now comes to \$495k plus \$20k for office overheads so that is \$515k. Rest is my salary and other overheads plus a months worth of salary to come. Hopefully that is a better reflection. Sorry it has taken so long. Hope this afternoon's meeting went OK

Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>
Sent: Wednesday, 1 June 2022 3:08 pm
To: Dean Nelson <dnelson@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

Thanks Dean

My 'test' for you at the end of the day. Hand on heart does it feel right? I don't care about exactly right, but ball park right!

From: Dean Nelson <dnelson@doc.govt.nz>
Sent: Wednesday, 1 June 2022 2:54 pm
To: Ken Hughey <khughey@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

I have used a direct cost approach of getting hours out of the weeds GIS for example and probably that doesn't always reflect true costs – I can't easily factor in vehicle and herbicide costs. Also, what about the time spend entering and analyzing data and writing up reports – should I include that. I can do some more work around that.

There is not a lot else species wise that relates to PRR 'area of interest'. I have left out some things like knobbled weevil and the whole of the Ohau Forests possum (and more recently predator) control which is all for mistletoe and Pit pat. Should some or all of that be included?

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Wednesday, June 1, 2022 11:48 AM

To: Dean Nelson <dnelson@doc.govt.nz>

Subject: RE: Ken's view of the world - 30 May 2022

Dean – thanks

Where are we putting all the other PRR work? Also, as you asked before, DOC's spend on species will be very significant I would have thought and looking forward to seeing that. Happy to chat!

Ken

From: Dean Nelson <dnelson@doc.govt.nz>

Sent: Wednesday, 1 June 2022 9:45 am

To: Ken Hughey <khughey@doc.govt.nz>

Subject: RE: Ken's view of the world - 30 May 2022

Hi Ken,

Updated spreadsheet. I have tried to only include things that relate to PRR 'area of interest'

There are a couple of [REDACTED] costs in there that you may already have under your totals that you have got from them. Not sure of all the [REDACTED] stuff either as I have just trawled through SAP-BI to get that.

Get back to me if any questions

Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Wednesday, 1 June 2022 8:57 am

To: Dean Nelson <dnelson@doc.govt.nz>

Subject: RE: Ken's view of the world - 30 May 2022

Yes pse, if linked to 'river', e.g., terns, kaki river monitoring

From: Dean Nelson <dnelson@doc.govt.nz>

Sent: Tuesday, 31 May 2022 11:46 am

To: Ken Hughey <khughey@doc.govt.nz>

Subject: RE: Ken's view of the world - 30 May 2022

Hi Ken,

Progressing with expenses for the various zones. Do you want me to include species management work as part of it?

Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Tuesday, 31 May 2022 11:21 am

To: Dean Nelson <dnelson@doc.govt.nz>; Nicki Atkinson <natkinson@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Richard Maloney <rmaloney@doc.govt.nz>

Cc: Adrian Gilby <agilby@doc.govt.nz>; Aaron McKay <aamckay@doc.govt.nz>; Hughey, Kenneth S [REDACTED]

Subject: Ken's view of the world - 30 May 2022

Hi Team – please find attached a think piece as a starter for Thursday. This is not meant to be the definitive view of the world, but hopefully something to respond to.

Note I will not be at tomorrow's catch up meeting, and that after our workshop on Thursday I am heading off to meet with the 3 papatipu runanga at 1pm

Thanks and looking forward to Thursday morning.

Work type	Work	Per annum	Sub total	Significant recent one-offs	Notes
Weeds	river weed work J4N funded via	\$ 830,914.00			Zones 4 and 3A
	PRR	\$ 158,614.00		\$95337 in Lower Ohau 2019/20. Needs doing every 2-3 years	Zones 4, 3A, 3B, 2
	DOC	\$ 29,781.00			
		\$ 48,940.00			Tekapo and Dobson
	separate to above	\$ 15,000.00	\$ 1,068,249.00		Dobson
	funded rabbit control via in Tekapo, Ohau, Pukaki, Tasman, Ahuriri, Godley riverbeds	\$ 610,584.00			
Rabbits	DOC in Tasman riverbed	\$ 127,868.00	\$ 738,452.00		
Staff costs not covered elsewhere	project	\$ 215,730.00			
Species management - kaki	Wild kaki management	\$ 81,039.00			
	Captive kaki management	\$ 161,427.00	\$ 242,466.00		
Species management - black-fronted tern	Tern Island - PRR	\$ 16,048.00	\$ 16,048.00		
Species management - Braided riverbed bird surveys	Tasman, Dobson, Hakataramea	\$ 5,516.00			
Species management - lizards	Lizard monitoring	\$ 6,716.00			Protected by predator control
	Lizard monitoring - PRR	\$ 6,304.00	\$ 13,020.00		Protected by predator control
Species management - threatened fish	Macrophyte control, trout barrier maintenance and monitoring	\$ 23,200.00			Includes some staff time for trout removal in Fork Stream
Species management - invertebrates	Grasshopper surveys and monitoring	\$ 8,065.00			
Species management - threatened and ephemeral plants	Plant surveys, seeding and germination trials, monitoring and survey	\$ 13,020.00			
Predator Control mammalian	Various species via	\$ 30,119.00			Quite a bit missing out of here
	Various species via DOC	\$ 151,413.00		\$92000 for traps	Huxley Hopkins
	Various species separate to above	\$ 60,000.00		Trap costs not available	Dobson
	Various species PRR	\$ 152,663.00	\$ 394,195.00	\$20000 Tern Island trap replacement 2020/21	Tasman, Tern Island
Pest control - possum	Possum control Huxley Hopkins	\$ 112,805.00			
Predator Control avian	black-backed gull control	\$ 30,594.00			
	PRR black-backed gull control	\$ 24,447.00	\$ 55,041.00		
	Canada goose control	\$ 57,957.00	\$ 57,957.00		
Pest bird control	BFT - Tasman predator control	\$ 9,912.00	\$ 9,912.00		
Outcome monitoring					
Research and management	DOC Uni Predator fence insects	\$ 10,000.00	\$ 10,000.00	\$130,000	one-off was recent fence build includes \$10k DOC support, University in-kind and scholarships
Research and management	DOC/Uni River dynamics research Cass	\$ 110,000.00	\$ 110,000.00		
Research and management	DOC/Uni/PRR black fronted tern movements research	\$ 100,000.00	\$ 100,000.00		
Research and management	DOC/PRR River terr invertebrate sampling	\$ 50,000.00	\$ 50,000.00		
Research and management	DOC grasshopper and weta field and advice	\$ 20,000.00	\$ 20,000.00		TSU time
	DOC/PRR Tu Te Rakiwhanoa Mackenzie rivers invertebrate refence collection work	\$ 30,000.00	\$ 30,000.00		
Research and management	DOC hedgehog impacts on invertebrate/lizard research	\$ 60,000.00	\$ 60,000.00		Calculated as 40% of total project costs (4 of 6 sites for invertebrates, 2 of 6 sites for lizards and 2 of 6 sites for hedgehog trapping methods)
Weeds	Weeds and river works operation budget?	\$ 178,000.00	\$ 178,000.00		
	DOC/farmer River fence maintenance - Tekapo,				
Rabbit fencing	Pukaki, Ohau	\$ 84,825.00	\$ 84,825.00		
Zone committee funding	Fencing and other river/wetland projects	\$ 104,000.00	\$ 104,000.00		
Biosecurity funding	Weed control	\$ 20,000.00	\$ 20,000.00		
	DOC tenure review wetland and riverbed purchases (eg Cass, Ahuriri riverbeds,Mt Gerald wetland)			\$3mill-\$7.5 mill ++	I haven't calculated this, but it will be at least this much
Lower Waitaki					
Weeds		\$ 48,000.00	\$ 48,000.00		
	Lower waitaki Geraldine ops team	\$ 70,000.00	\$ 70,000.00		
	Lower Waitaki ops budget for nga awa work going forward	\$ 90,000.00	\$ 90,000.00		
Freshwater work					
Reseach and management	Nga Awa Waitaki river restoration report with costings			\$ 50,000.00	
	Nga Awa Waitaki R land encroachment study (from 2019/20)			\$ 60,000.00	couple of years ago but still a very relevant piece of work/cost
Reseach and management	Nga Awa staff time 0.5FTE Snr Ranger, 0.3FTE C Band and 0.2FTE Tech Advisor	\$ 100,000.00	\$ 100,000.00		
	Nga Awa work on sediment movment in Rangitāt - applicable to all braided rivers pro rated (1/4th)			\$ 25,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$100. Proportioned as 1 out of 4 doc regions work is applicable too
	Migatory Fish programme - guidance on Inanga monitoring pro rata (1/9th)			\$ 2,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$200. Proportioned as 1 out of 9 doc regions work is applicable too
Reseach and management	Migatory Fish programme - kanakana larval fishing methods pro rata (1/9th)			\$ 2,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$15k. Proportioned as 1 out of 9 doc regions work is applicable too
Reseach and management	Migratory fish programme - glass eel reseach work pro rata (1/9th)			\$ 3,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost \$30k. Proportioned as 1 out of 9 doc regions work is applicable too
Reseach and management	Migatory fish programme - NIWA report on eel trap and transfer pro rata (1/7th)			\$ 3,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost \$30k Proportioned as 1 out of 7 doc regions work is applicable too
Reseach and management	CRESP programme - reduced flow scenarios with trout and non migratory glaxias reseach pro rata (1/2)			\$ 30,000.00	work that will support nga awa restoration at Waitaki and other rivers. Total cost \$60k Proportioned as 1 out of 2 doc regions work is applicable too
Reseach and management	Freshwater Biosecurity programme support to check clean dry - pro rata (1/9th)	\$ 6,000.00	\$ 0.00		work that will support nga awa restoration at Waitaki and other rivers. Total cost \$50k Proportioned as 1 out of 9 doc regions work is applicable too
TSU					
Reseach and management	Technical Support for Waitaki River (Colin, etc)	\$ 15,000.00	\$ 5,000.00		
Reseach and management	Woody vegetation restoration on Eastern South Island limestone*	\$ 30,000.00	\$ 30,000.00		*These projects are on limestone ecosystems within the Waitaki Valley
Reseach and management	Control and influence of invasive swarding grasses on native plant*	\$ 7,000.00	\$ 7,000.00		
	Rare calcicolous plant propagation and translocation; and Pollinators of rare calcicolous plants diversity and efficiency*	\$ 10,000.00	\$ 10,000.00		
Reseach and management	Threatened Plant Monitoring in the Waitaki*	\$ 15,000.00	\$ 15,000.00		
Total			\$3,753,165		

From: [Adrian Gilby](#)
To: [Ken Hughey](#); [Dean Nelson](#); [Richard Maloney](#); [Colin O'Donnell](#); [Nicki Atkinson](#)
Cc: [Aaron McKay](#)
Subject: Waitaki options workshop summary draft
Date: Friday, 3 June 2022 2:29:28 pm
Attachments: [Waitaki workshop summary - draft.docx](#)

Good Afternoon Everyone,

Attached, please find a draft document covering yesterday's workshop. This summary was compiled from the notes taken by our scribe Aaron with additional thought input from Ken. This summary has not yet been added to docCM. We are still smoothing language, etc, but wanted to get this to you for feedback asap.

I'd ask that everyone please take a look at the attached copy and provide comments **NLT than 10:00 am on Tuesday, 7 June**. Apologies for the tight turnaround, but Ken has to present the summary to the Governance group on Tuesday afternoon. To speed along the process, please just make comments, corrections, additions, etc. directly to your attached copy (track changes should be on), save as a new file, and email directly to Aaron (with a cc to Ken and myself). We'll consolidate everything as quickly as we can.

Please let me know if there are any questions and thank you again to everyone for your engagement and cooperation.

Cheers,

Adrian Gilby

National Systems Maintenance Advisor

Department of Conservation - *Te Papa Atawhai*

9 (2) (a)

Conservation leadership for our nature *Tākina te hī, Tiakina, te hā o te Āo Tūroa*

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From: [Aaron McKay](#)
To: [Ken Hughey](#); [Adrian Gilby](#)
Subject: RE: Waitaki bottomline notes - KH edits 3 June 2022
Date: Friday, 3 June 2022 12:24:25 pm
Attachments: [Waitaki bottomline notes - KH edits 3 June 2022.docx](#)

Kia ora Kōrua,

Sorry about the delay, was just held up in a meeting.

Please find attached a few points. Have tried to address the comments in there but yes overall agreed with Adrian below.

Thanks for letting me be involved and let me know if there is anything else that I can provide on this.

Ngā mihi

Aaron

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Friday, 3 June 2022 11:32 am

To: Adrian Gilby <agilby@doc.govt.nz>; Aaron McKay <aamckay@doc.govt.nz>

Subject: RE: Waitaki bottomline notes - KH edits 3 June 2022

Thanks Adrian – just checking whether Aaron wants to come back to me or I just finalise and then you send out to participants?

From: Adrian Gilby <agilby@doc.govt.nz>

Sent: Friday, 3 June 2022 11:01 am

To: Aaron McKay <aamckay@doc.govt.nz>; Ken Hughey <khughey@doc.govt.nz>

Subject: Waitaki bottomline notes - KH edits 3 June 2022

Hi Ken,

For my 2 cents, this looks really good. It builds on Aaron's summary and balances well the discussion yesterday, your paper, and the potential path options for leadership to consider.

Please let me know if you need anything else on my end or if we can support your efforts. Really excellent read!

Cheers,

Adrian

Sent from Workspace ONE Boxer

On 3/06/2022 10:03 am, Ken Hughey <khughey@doc.govt.nz> wrote:

Hi guys – see attached. Interest in thoughts about what is what we did and then my sort of conclusions at the end

From: [Herb FAMILTON](#)
To: [Ken Hughey](#); [Karina Morrow](#)
Cc: [Susan Newell](#)
Subject: Document Link: Waitaki Final HEP Bottom Line
Date: Thursday, 2 June 2022 5:15:02 pm

Waitaki Final HEP Bottom Line

<https://doccm.doc.govt.nz:443/wcc/faces/wccdoc?dDocName=DOC-7039324>

I've inserted Deans latest figure and used reserve bank NZ inflation calculator.

Herb

Released under Official Information Act

From: [Dean Nelson](#)
To: [Ken Hughey](#)
Subject: RE: Ken's view of the world - 30 May 2022
Date: Thursday, 2 June 2022 4:59:33 pm
Attachments: [Work in zones for renegotiation.xlsx](#)

Right Ken, I have added a few extra things in – [REDACTED] predator control in Ohau Forests, also possum control in the same areas. I have tried to add a bit of vehicle costs into things and there is still a bit of weed work to come – put as anticipated weed control. PRR total now comes to \$495k plus \$20k for office overheads so that is \$515k. Rest is my salary and other overheads plus a months worth of salary to come. Hopefully that is a better reflection. Sorry it has taken so long. Hope this afternoon's meeting went OK.
Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>
Sent: Wednesday, 1 June 2022 3:08 pm
To: Dean Nelson <dnelson@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

Thanks Dean

My 'test' for you at the end of the day. Hand on heart does it feel right? I don't care about exactly right, but ball park right!

From: Dean Nelson <dnelson@doc.govt.nz>
Sent: Wednesday, 1 June 2022 2:54 pm
To: Ken Hughey <khughey@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

I have used a direct cost approach of getting hours out of the weeds GIS for example and probably that doesn't always reflect true costs – I can't easily factor in vehicle and herbicide costs. Also, what about the time spend entering and analyzing data and writing up reports – should I include that. I can do some more work around that.

There is not a lot else species wise that relates to PRR 'area of interest'. I have left out some things like knobbled weevil and the whole of the Ohau Forests possum (and more recently predator) control which is all for mistletoe and Pit pat. Should some or all of that be included?

From: Ken Hughey <khughey@doc.govt.nz>
Sent: Wednesday, June 1, 2022 11:48 AM
To: Dean Nelson <dnelson@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

Dean – thanks

Where are we putting all the other PRR work? Also, as you asked before, DOC's spend on species will be very significant I would have thought and looking forward to seeing that. Happy to chat!
Ken

From: Dean Nelson <dnelson@doc.govt.nz>
Sent: Wednesday, 1 June 2022 9:45 am
To: Ken Hughey <khughey@doc.govt.nz>
Subject: RE: Ken's view of the world - 30 May 2022

Hi Ken,

Updated spreadsheet. I have tried to only include things that relate to PRR 'area of interest' There are a couple of [REDACTED] costs in there that you may already have under your totals that you have got from them. Not sure of all the [REDACTED] stuff either as I have just trawled through SAP-BI to get that.

Get back to me if any questions

Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Wednesday, 1 June 2022 8:57 am

To: Dean Nelson <dnelson@doc.govt.nz>

Subject: RE: Ken's view of the world - 30 May 2022

Yes pse, if linked to 'river', e.g., terns, kaki, river monitoring

From: Dean Nelson <dnelson@doc.govt.nz>

Sent: Tuesday, 31 May 2022 11:46 am

To: Ken Hughey <khughey@doc.govt.nz>

Subject: RE: Ken's view of the world - 30 May 2022

Hi Ken,

Progressing with expenses for the various zones. Do you want me to include species management work as part of it?

Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Tuesday, 31 May 2022 11:21 am

To: Dean Nelson <dnelson@doc.govt.nz>; Nicki Atkinson <natkinson@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Richard Maloney <rmaloney@doc.govt.nz>

Cc: Adrian Gilby <agilby@doc.govt.nz>; Aaron McKay <aamckay@doc.govt.nz>; Hughey, Kenneth <[REDACTED]>

Subject: Ken's view of the world - 30 May 2022

Hi Team – please find attached a think piece as a starter for Thursday. This is not meant to be the definitive view of the world, but hopefully something to respond to.

Note I will not be at tomorrow's catch up meeting, and that after our workshop on Thursday I am heading off to meet with the 3 papatipu run nga at 1pm

Thanks and looking forward to Thursday morning.

Ken

Costs of work undertaken in Mackenzie basin 2021-22

Date	Description	Site	Method	Contractor/staff	Who paid	Cost (excl GST)
13/05/2022	Lupin control	Upper Fork Stream	Contractor ground spray			\$ 1 738.00
27/04/2022	Lupin and broom	Lower Fork Stream	Contractor ground spray			\$ 1 961.00
8/05/2022	W/ low control	Macaulay River	Contractor chainsaw			\$ 29 261.00
2/05/2022	W/ low control	Lower cass	Contractor chainsaw			\$ 2 592.00
22/04/2022	W/ low control	Coal River	Contractor chainsaw			\$ 962.00
29/03/2022	W/ low control - transport crews	Godley delta/Tasman	He icopter transport			\$ 8 360.00
10/04/2022	W/ low control	Coal River	Contractor chainsaw			\$ 862.00
16/02/2022	W/ low control - transport crews	Godley delta	He icopter transport			\$ 7 590.00
4/03/2022	W/ low control	Coal River	Contractor chainsaw			\$ 34 180.00
19/03/2022	W/ low and some broom control	Coal River Godley and Jollie	Contractor chainsaw and spray			\$ 26 251.00
12/02/2022	W/ low and some broom control	Coal River and Lake Tekapo	Contractor chainsaw and spray			\$ 32 865.00
16/01/2022	Weed control	Godley delta	Aerial spray			\$ 10 260.00
21/01/2022	W/ low control - transport crews	Godley delta/Tasman	He icopter transport			\$ 18 342.00
29/01/2022	W/ low and some broom control	Coal River and Lake Tekapo	Contractor chainsaw and spray			\$ 27 502.00
30/04/2022	Lupin control	Fork Stream?	Aerial spray			\$ 5 085.00
6/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 3 237.00
3/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 9 666.00
5/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 2 165.00
26/04/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 2 459.00
19/03/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 10 270.00
18/03/2022	Lupins and willows	Cass River/Fork Stream	Contractor ground spray			\$ 4 222.00
15/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 789.00
12/03/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 17 689.00
11/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 1 842.00
4/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 3 800.00
26/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 18 117.00
25/02/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 4 063.00
21/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 35 370.00
17/02/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 5 284.00
13/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 14 753.00
12/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 5 587.00
9/02/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 5 148.00
22/01/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 43 576.00
9/02/2022	Lupin control	Mistake Creek	Contractor ground spray			\$ 4 636.00
17/01/2022	Lupin control	Mistake Creek Fork Stream Godley delta	Contractor ground spray			\$ 4 164.00
22/01/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 31 858.00
17/12/2021	Lupin Control	Irishman Creek	Contractor ground spray			\$ 5 695.00
14/12/2021	Lupin and w flow control	Cass River	Contractor ground spray			\$ 2 053.00
14/12/2021	Lupin Control	Irishman Creek	Contractor ground spray			\$ 22 666.00
24/11/2021	Lupin control	Coal River	Contractor ground spray			\$ 5 784.00
18/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 2 002.00
27/04/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 1 961.00
31/03/2022	Weed control	Godley delta Coal River Jollie River	Aerial spray			\$ 20 570.00
31/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 4 009.00
25/03/2022	Weed control	Fork Stream Cass River	Contractor ground spray			\$ 4 357.00
23/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 1 948.00
31/03/2022	Weed control	Godley Cass and Tasman Rivers Mistake Creek	Aerial spray			\$ 14 200.00
6/02/2022	Lupin broom control	Coal River Lake Tekapo	Contractor ground spray			\$ 11 500.00
6/02/2022	Gorse broom control	Coal River	Contractor ground spray			\$ 17 180.00
17/01/2022	Chemical					\$ 2 611.00
24/11/2021	Gorse broom lupin control	Coal River Washdyke Stream	Contractor ground spray			\$ 9 013.00
20/05/2022	W/ low control	Coal and Godley Rivers	Contractor chainsaw and spray		PRR	\$ 14 120.00
27/05/2022	W/ low control	Coal and Godley Rivers	Contractor chainsaw and spray		PRR	\$ 18 500.00
	Anticipated willow/ weed control	Godley River	Contractor chainsaw and spray		PRR	\$ 40 000.00
	Lupin control for Chenopodium	Southeast bay Lake Tekapo	ground spray	Staff	DOC	\$ 592.00
	Lupins and other weeds	Lake shoreline Tekapo River and associated wetlands	ground spray	Staff	PRR	\$ 3 254.00
	Various weeds	Upper Tekapo River	General ly ground spray	Contractors	PRR split bet ween [redacted] and [redacted]	\$ 33 440.00
	Various weeds	Upper Tekapo River above Lake George Scott	General ly ground spray	Contractors	PRR split bet ween [redacted] and [redacted]	\$ 2 000.00
					PRR	\$ 692,646.00
					Total	\$ 692,646.00 PRR total \$93 501

Date	Description	Site	Method	Contractor/staff	Who paid	Cost (excl GST)	Comments
	Predator control braided rivers	Fork Cass Godley	Trapping	Staff		\$ 9 575.00	
	Robust grasshopper	Patersons terrace		staff		\$ 2 825.00	
	Feral cat control	Various		staff		\$ 2 947.00	
	Lizard baseline monitoring			staff		\$ 6 7 6.00	
	Patersons Terrace management	Patersons Terrace		staff		\$ 14 772.00	
	Staff management costs			staff		\$ 247 596.00	
	Rabbit control	Godley Maculay	aerial toxin	Contractor		\$ 118 1 8.00	
	Rabbit control	Glenmore Cass	aerial toxin	Contractor		\$ 138 078.00	
	Black-backed gull control	Fork Cass Godley Macaulay	Aerial shoot	Staff and contractor		\$ 30 594.00	
	Canada Goose control	Fork Cass Godley Macaulay	Aerial shoot	Staff and contractor		\$ 57 957.00	
	█ staff costs			staff		\$ 215 7 0.00	
	Brachaspis robustus monitoring	Ohau R Fork Stream Patersons Terrace Pukaki R Snowy R	Monitoring transects	staff	PRR	\$ 2 320.00	
	Sigaus minutus monitoring	Tekapo R	Monitoring transects	staff	PRR	\$ 2 920.00	
	Threatened plant management	Lower and upper Ohau R Tekapo.	Monitoring seed trials nursery	Staff	DOC	\$ 6 440.00	Half in this zone and half in Zone 3B
	Threatened fish protection - trout removal	Fork Stream	electric fishing	Staff	DOC	\$ 15 760.00	Including fo █ staff time
	Fencing project	Various sites	Repair fences and add rabbit netting	Staff	DOC	\$ 84 825.00	
	Support for hedgehog research project	Tekapo sites	Download SD cards and charge batteries	Staff	PRR	\$ 1 840.00	
			bait	Staff			
							PRR total \$7080

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Date	Description	Site	Method	Contractor/staff	Who paid	Cost (excl GST)	Comments
/05/2021	Lupin control	Lake Pukaki eastern side	Contractor ground spray			\$ 9 666.00	
10/09/2022	weed control and transport crews	Tasman delta	Aerial spray and transport			\$ 9 010.00	
19/09/2022	Lupin Control	Mt Cook - Hooker flats	Contractor ground spray			\$ 6 696.00	
22/09/2022	Lupin control	Tasman River	Contractor ground spray			\$ 1 183.00	
22/09/2022	Lupin control	Olivia fen	Contractor ground spray			\$ 1 101.00	
12/09/2022	Lupin Control	Mt Cook - Hooker flats	Contractor ground spray			\$ 10 483.00	
8/09/2022	Lupin control	Lake Pukaki eastern side	Contractor ground spray			\$ 9 713.00	
4/9 /2022	Lupin control	Lake Pukaki eastern side	Contractor ground spray			\$ 21 160.00	
27/02/2022	Lupin control	Tasman River	Contractor ground spray			\$ 2 706.00	
24/02/2022	Lupin control	Tasman River	Contractor ground spray			\$ 3 514.00	
30/0 /2022	Lupin control	Tasman River	Contractor ground spray			\$ 3 393.00	
16/12/2021	Lupin control	Tasman	Contractor ground spray			\$ 6 124.00	
24/0 /2022	Lupin broom and willow control	Tasman River	Contractor ground spray			\$ 3 540.00	
16/0 /2022	Lupin broom and willow control	Tasman River	Contractor ground spray			\$ 2 991.00	
15/12/2021	Lupin broom willow control	Tasman Hooker	Contractor ground spray			\$ 6 124.00	
16/12/2021	Weed control	Jo lie delta Tasman River	Aerial spray			\$ 21 090.00	
2 /12/2021	Lupin broom and willow control	Tasman River	Contractor ground spray			\$ 1 348.00	
14/12/2021	Lupin and willow control	Tasman River Coal River	Contractor ground spray			\$ 5 835.00	
5/12/2021	Lupin Control	Mt Cook	Contractor ground spray			\$ 40 547.00	
30/11/2021	Lupin control	Whale Stream	Contractor chainsaw and spray			\$ 27 502.00	
/04/2022	Weed control	Godley Hooker rivers	Contractor ground spray			\$ 4 736.00	
19/09/2022	Willow control	Coal and Tasman Rivers	Contractor chainsaw and spray			\$ 12 896.00	
9/09/2022	Lupin alder and willow control	Tasman River	Contractor ground spray			\$ 2 276.00	
6/01/2022	Lupin broom alder and w flow control	Tasman Jo lie River	Contractor ground spray			\$ 2 974.00	
30/11/2021	Lupin broom alder and w flow control	Jo lie River delta	Contractor ground spray			\$ 5 844.00	
9/12/2021	Weed control	Tasman and Jollie Rivers	Aerial spray			\$ 17 460.00	
26/1 /2021	broom control	Jollie River	Contractor ground spray			\$ 6 020.00	
14/1 /2021	Lupin broom control	Jollie River	Contractor ground spray			\$ 4 247.00	
3 /05/2022	Lupin control	Hooker flats	Contractor ground spray			\$ 5 169.00	
	Willow lupin and other weed control	Dobson	Aerial spray		PRR	\$ 20 000.00	Four way contribution to weed control PRR and landowner
	Willow lupin and other weed control	Dobson	Aerial spray		PRR and landowner	\$ 50 000.00	Estimated for these three contributions. May already be included in PRR
	Predator Control	Dobson	Trapping	Contractor	landowner	\$ 40 000.00	Notes that item has already
	Predator Control	Hopkins Hudley Temple	Trapping	Staff (Time on next line)	DOC via	\$ 158 588.00	Trap checks only doesn't include recent set up costs
	Predator Control	Hopkins Hudley Temple	Trapping	Staff time	DOC via	\$ 84 825.00	\$92k for trap purchase
	Possum control	Hopkins Hudley Temple	Trapping and toxins	Staff time	DOC	\$ 112 805.00	Half of combined trapping/fencing project
	Kaki w ld management	Various sites around the basin but using the Tasman as a focus	Searching for nests collecting eggs and monitoring birds	Ecological contracting services and staff	DOC	\$ 81 039.00	All kaki wild costs lumped into this cost
	Tasman Predator Control	Tasman	Trapping and spot lighting		PRR and DOC	\$ 70 927.00	
	Tasman Predator Control outcome monitoring	Tasman	Monitoring Black-fronted tern nests	Staff	PRR	\$ 9 912.00	
	Tasman Bird survey	Tasman	1 day walk through survey	staff	PRR	\$ 3 208.00	
	Dobson Bird Survey	Dobson	2 day walk through survey	staff	PRR	\$ 886.00	
	Rabbit Control	Tasman	Aerial toxin	Contractor	DOC	\$ 127 868.00	
	Rabbit control	Glenlarnier Tasman	aerial toxin	Contractor		\$ 354 368.00	
	Black-backed gull control	Tasman Tekapo Dobson Rivers	Aerial shoot	Staff and helicopter	PRR	\$ 24 447.00	
	Weed control	Lake Ohau shoreline and feeder streams	Ground spray	Staff	PRR	\$ 9 920.00	
	Riverbed invertebrate sampling	Tasman Cass	Invertebrate trapping and collection	Staff	PRR	\$ 20 000.00	Tu combu studies. Other costs in Richards Spreadsheet
	Lizard monitoring	Tasman	Lizard monitoring using ACOs	staff	PRR	\$ 620.00	
						PRR total \$444 164	

Date	Description	Site	Method	Contractor/staff	Who paid	Cost (excl GST)	Comments
2019/20	Weed control	Lower Ohau	Ground spray		PRR	\$ 95 337.00	Note that this wasn't done this year but in 2019/20. Needs follow up every 2-3 years
	Weed Control	Tern Island	Ground spray		PRR	\$ 3 816.00	
	Weed Control	Tern Island and lizard site	Ground spray	Staff	PRR	\$ 1 908.00	
	Predator control and rat detection	Tern Island	Trapping rat dog data management	Contractors and staff	PRR	\$ 79 120.00	
	Cat control	Tern Island	Spotlighting	Staff	PRR	\$ 2 616.00	
	Predator monitoring	Tern Island	Tracking tunnels	Staff	PRR	\$ 1 560.00	
	Tern breeding monitoring	Tern Island	Monitoring breeding success	staff	PRR	\$ 16 048.00	
	Lakes skink monitoring	Tern Island site	Mark recapture	staff	PRR	\$ 3 520.00	
	Lakes and scree skink monitoring	Benmore Gullies site	Mark recapture	staff	PRR	\$ 2 164.00	
	Kaki captive rearing	Aviary	Captive rearing	Staff	DOC	\$ 161 427.00	Includes staff time and other costs
	Macrophyte control and threatened fish monitoring	Fraser Stream and Waterwheel Wetland trout barriers	Spray and hand removal of macrophytes monitoring of fish	Staff	DOC	\$ 3 024.00	
	Threatened plant management	Various sites	Monitorine seed trials nursery	Staff	PRR	\$ 13 020.00	Half in this zone and half in Zone 4
	Weed control	Pukaki River	Ground spray	Staff	PRR	\$ 212.00	
	Woody weed control	Lake Poaka and Waterwheel Wetland	Ground spray	Tree and Scrub Control	PRR	\$ 9 846.00	
	Weed control	Fraser Stream and wetlands Darts Bush Stream	Ground spray	Staff	PRR	\$ 5 754.00	
	Black-fronted tern tracking research	Tern Island and Cass	Deploy GPS trackers	Staff	PRR	\$ 21 544.00	Combined DOC/University and PRR study. Other costs in Richards Spreadsheet
	Bittern tracking	Various wetlands	Deploy and collect call recorders	Staff	PRR	\$ 4 230.00	PRR total \$165 358 (excludes \$95 337 in top row from 2019/20)

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Date	Description	Site	Method	Contractor/staff	Who paid	Cost (excl GST)	Comments
25/02/2022	Weed control	Upper Ahuriri	Aerial spray	██████████	DOC	\$ 20 737.00	Problem inherited as a result of Tenure Review of Twin Peaks. Adjacent landowner also contributing to control lower down but unknown amount
	Weed control	Upper Ahuriri	Aerial spray	Staff	DOC	\$ 560.00	
	Willow control and sma l patch of lupins	Upper Ahuriri	Aerial spray	██████████	PRR	\$ 29 276.00	
9/03/2022	Lupin control	Tributary of Omarama Stream	Aerial spray	██████████	PRR	\$ 17 234.00	Problem inherited as a result of Tenure Review of Twin Peaks. Adjacent landowner also contributing to control lower down but unknown amount
0/03/2022	Lupin control	Tributary of Omarama Stream	Aerial spray	██████████	DOC	\$ 8 484.00	Problem inherited as a result of Tenure Review of Twin Peaks. Adjacent landowner also contributing to control lower down but unknown amount
	Lupin control	Birchwood area	Ground spray	Staff	PRR	\$ 2 624.00	
	Woody weeds	Ahuriri River	Ground spray	Staff	PRR	\$ 270.00	
	Woody weeds	Ahuriri River near Ki Iermont	Ground spray	Staff	PRR	\$ 494.00	
	Macrophyte control and threatened fish monitoring	Spring-fed stream protected by trout barrier Ahuriri River	Spray and hand removal fish traps	staff	DOC	\$ 536.00	
Jun-22	Macrophyte control trout removal and threatened fish monitoring	Spring-fed streams protected by natural trout barriers Otamatapalo River	Spray and hand removal electric fishing		DOC	\$ 1 880.00	PRR total 5848 000
	Anticipated willow control	Upper Ahuriri	Chainsaw and poison	Contractor	PRR	\$ 35 000.00	

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From: [Nicki Atkinson](#)
To: [Richard Maloney](#); [Ken Hughey](#)
Cc: [Dean Nelson](#); [Colin O'Donnell](#); [Hughey, Kenneth](#); [Karina Morrow](#); [Herb Familton](#)
Subject: RE: Ken's view of the world - 30 May 2022
Date: Wednesday, 1 June 2022 4:44:02 pm
Attachments: [Copy of Approximate current costs Waitaki catchment June 2022 NA edits.xlsx](#)
[Lower Waitaki River Conservation and Restoration - Draft Report.msg](#)

Hi Ken

I've added the bio costs to Richard's spreadsheet (attached), both the TSU costs as well as the costs across the Freshwater teams. There's not much in the way of Nga Awa work happening in the Waitaki at the moment, it's still in the 'set-up/development' phase but there's also a lot of other work happening nationally that would apply to the Waitaki, e.g. our work on understanding/improving trap and transfer for tuna. For these pieces of work I've pro-rated the cost based on the number of DOC regions the work is applicable too. You can choose whether to include this or not.

I've also included the Geraldine Ops work that I know about.

I think I sent this to you awhile back but will add it again in case you missed it – Nga Awa has commissioned a report on the Lower Waitaki and how to restore it, with costing for the restoration work, so highly relevant & useful for this work. See attached.

Some other costs comparisons that may be of interest – Nga Awa got \$48M in Job for Nature money for fencing and planting and pest control across 6 river sites. One of these was the Rangatata catchment (both upper and lower) which got \$20M of the \$48M over four years. And to answer your question re Ngai Tahu engagement as I understand from Brad Edwards, the Nga Awa River Ranger, they have had some initial conversations with the Runanga and heard that their focus was on the consenting process for the time being, they have also done their own catchment plan and are hoping agencies would come in to be part of this in time. Brad's focus currently is more on the Rangatata River, it's intended that the Waitaki Nga Awa work will develop more over coming years, alongside Iwi.

Thanks,

Nicki

From: Richard Maloney <rmaloney@doc.govt.nz>

Sent: Wednesday, 1 Jun 2022 12:21 pm

To: Ken Hughey <khughey@doc.govt.nz>

Cc: Dean Nelson <dnelson@doc.govt.nz>; Nicki Atkinson <natkinson@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Hughey, Kenneth 9(2) (a) Karina Morrow <kmorrow@doc.govt.nz>; Herb Familton <hfamilton@doc.govt.nz>

Subject: FW: Ken's view of the world - 30 May 2022

Hi Ken

Wasn't sure if you actually wanted a response to this, so I haven't commented on your text.

I have had a look at the \$\$ contributions you have listed – its not clear yet what this list is supposed to represent with regard to combinations of current, ongoing, regular costs, but it does seem to be missing a number of relevant things.

Therefore, I have taken your list, and put it into excel, and have added the most obvious gaps (still needs to add in the ones that you may get from Nicki and others in Bio Gp via your request). There are some missing values that it would be useful for you and Dean to collate to complete this.

Hope that helps.

Cheers

Richard

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Tuesday, 31 May 2022 11:21 am

To: Dean Nelson <dnelson@doc.govt.nz>; Nicki Atkinson <natkinson@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Richard Maloney <rmaloney@doc.govt.nz>

Cc: Adrian Gilby <agilby@doc.govt.nz>; Aaron McKay <aamckay@doc.govt.nz>; Hughey, Kenneth <9(2) (a)>

Subject: Ken's view of the world - 30 May 2022

Hi Team – please find attached a think piece as a starter for Thursday. This is not meant to be the definitive view of the world, but hopefully something to respond to.

Note I will not be at tomorrow's catch up meeting, and that after our workshop on Thursday I am heading off to meet with the 3 papatipu runanga at 1pm

Thanks and looking forward to Thursday morning.

Ken

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Work type	Work	Per annum	Significant recent one-offs	Notes
Weeds	river weed work JAN funded via [redacted]	\$800 000		
Rabbits	DOC rabbit control in Tekapo Ohau Pukaki Tasman Ahuriri Godley riverbeds	\$600 000	Dean can you check total ha and frequency	Costs are \$150/ha (aerial 1080) over about 20000 ha = \$3m ll lets say every 5 years = \$600k per annum
Species mgmt	Doc kaki programme	Dean		
Research and management	DOC [redacted] Uni Predator fence insects	\$ 0 000		\$1 0 000 one-off was recent fence bu ld
Research and management	DOC/Uni [redacted] River dynamics research Cass	\$1 0 000		Includes \$10k [redacted] DOC support University in-kind and scholarships
Research and management	DOC/Uni/PRR black fronted tern movements research	\$80 000		Excludes \$20k PRR
Research and management	DOC/PRR River terr invertebrate sampling	\$40 000		Excludes \$10k PRR
Research and management	DOC grasshopper and weta field and advice	\$20 000		TSU time
Monitoring	PRR grasshopper annual surveys	\$0		Costs in PRR line below
Research and management	DOC/PRR [redacted] Tu Te Rakiwhanoa Mackenzie rivers invertebrate reference collection work	\$20 000		Excludes \$10k PRR
Research and management	DOC hedgehog impacts on invertebrate/lizard research	\$60 000		Calculated as 40% of total project costs (4 of 6 sites for invertebrates 2 of 6 sites for lizards and 2 of 6 sites for hedgehog trapping methods)
Weeds	[redacted] Weeds and river works operation budget?	\$178 000		
Species mgmt	DOC [redacted] fish weirs	Dean		
Monitoring	[redacted] nutrient river monitoring	Ken		
	Unser costs from TSU RW Threats Bio teams	Ken requested		
	[redacted] DOC/farmer River fence maintenance - Tekapo Pukaki Ohau	?		
PRR weeds and predator	Meridian via PRR	Dean		This is the PRR work
PRR weeds and predator	Genesis via PRR	Dean		This is the PRR work
What is this work Ken?	Meridian with [redacted]	Ken		
What is this work Ken?	Genesis with [redacted]	Ken		
	[redacted] DOC tenure review wetland and riverbed purchases (eg Cass Ahuriri riverbeds Mt Gerald wetland)	\$3mill-\$7.5 mill		I haven't calculated this but it will be at least this much
Geraldine Ops				
	Lower waitaki weed work ops team	70000		
	Lower Waitaki ops budget for nga awa work going forward	90000		
Freshwater work				
Research and management	Nga Awa Waitaki river restoration report with costings			50000
	Nga Awa Waitaki R land encroachment study (from 2019/20)			60000 couple of years ago but still a very relevant piece of work/cost
Research and management	Nga Awa staff time: 0.5FTE Snr Ranger 0.3FTE C Band and 0.2FTE Tech Advisor	00000		
	Nga Awa work on sediment moment in Rangitāt - applicable to all braided rivers pro rata (1/4th)			25000 work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$ 00k. Proportioned as 1 out of 4 doc regions work is applicable too
Research and management	Migatory Fish programme - guidance on Inanga monitoring pro rata (1/9th)			2000 work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$20k. Proportioned as 1 out of 9 doc regions work is applicable too
Research and management	Migatory Fish programme - kanakana larval fishing methods pro rata (1/9th)			2000 work that will support nga awa restoration at Waitaki and other rivers. Total cost was \$15k. Proportioned as 1 out of 9 doc regions work is applicable too
Research and management	Migatory fish programme - glass eel research work pro rata (1/9th)			3000 work that will support nga awa restoration at Waitaki and other rivers. Total cost \$30k. Proportioned as 1 out of 9 doc regions work is applicable too
Research and management	Migatory fish programme - NIWA report on eel trap and transfer pro rata (1/7th)			3000 work that will support nga awa restoration at Waitaki and other rivers. Total cost 0k Proportioned as 1 out of 7 doc regions work is applicable too
Research and management	CRESF programme - reduced flow scenarios with trout and non migratory glass eel research pro rata (1/2)			30000 work that will support nga awa restoration at Waitaki and other rivers. Total cost 0k Proportioned as 1 out of 2 doc regions work is applicable too
Research and management	Freshwater Biosecurity programme support to check clean dry - pro rata (1/9th)	6000		work that will support nga awa restoration at Waitaki and other rivers. Total cost 0k Proportioned as 1 out of 9 doc regions work is applicable too
TSU				
Research and management	Technical Support for Waitaki River (Colin etc)	15000		
Research and management	Woody vegetation restoration on Eastern South Island limestone*	30000		*These projects are on limestone ecosystem within the Waitaki Valley
Research and management	Control and influence of invasive swarding grasses on native plant*	7000		
Research and management	Rare calcicolous plant propagation and translocation; and Po linators of rare calcicolous plants: diversity and efficiency*	10000		
Research and management	Threatened Plant Monitoring in the Waitaki*	15000		

Project name	Lower Waitaki River Catchment Conservation and Restoration	
DOC contacts	Marine Richardson (mricharson@doc.govt.nz) Rosemary Miller (rmiller@doc.govt.nz) Alexander Macdonald (alemacdonald@doc.govt.nz) Brad Edwards (bedwards@doc.govt.nz)	
Contractor	Instream Consulting Ltd	
Contractor contacts	Greg Burrell (gburrell@instream.co.nz) Clinton Webb (cwebb@instream.co.nz)	
Contractor project number		21310201
Date of data submission		28-Feb-22

Released under Official Information Act

Methods The Restoration Matrix was produced by Instream, and it supports a report of conservation values, pressures, and restoration opportunities in the Lower Waitaki River catchment. Costed items reflect restoration actions identified as priorities following a literature review, interviews with people from various agencies, and a costing workshop held between Instream and DOC on 28 January 2022. The scope included providing rough, order of magnitude cost estimates for priority restoration activities.

Items were costed by contacting experts with relevant experience, suppliers, and using our expert opinions. To produce these costings, a variety of assumptions were made. These are listed against each line item.

For items including staff time, consultants were costed at \$120/hr, and DOC staff at \$33/ hr (maximum C Band ranger rate).

A default overhead of 12.5% was applied to the total costs.

Total costs have been rounded to the nearest thousand, to avoid indicating false precision.

Released under Official Information Act

Released under Official Information Act

From: [Clinton Webb](#)
To: [Brad Edwards](#); [Marine Richardson](#); [Rosemary Miller](#); [Alexander Macdonald](#)
Cc: [DLVC_INSTREAM CONSULTING LTD](#)
Subject: Lower Waitaki River Conservation and Restoration - Draft Report
Date: Monday, 28 February 2022 1:29:30 pm
Attachments: [Instream.2022.Lower Waitaki Restoration Costing.xlsx](#)
[Instream.2022.Lower Waitaki.docx](#)
[Instream.2022.Lower Waitaki.pdf](#)

Hi all,

Please find our attached draft report and restoration matrix.

The restoration costings are complete, except we are still waiting on a price estimate for the bird tracking tags. That means there is still some uncertainty around the cost of the bird meta-population study. I have followed up and will update as soon as I get the information.

Thank you for the opportunity to be involved with this highly rewarding project. We look forward to hearing your feedback.

Ngā mihi nui,
Clinton

Clinton Webb | Freshwater Ecologist | Instream Consulting Limited
314 Tuam Street, PO Box 1200, Christchurch 8140, New Zealand
T: 9 (2) (a) | E: cwebb@instream.co.nz | www.instream.co.nz

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From: [Dean Nelson](#)
To: [Ken Hughey](#); [Susan Newell](#)
Subject: RE: Waitaki HEP Bottom Line - DOC-7031836 (2) IN-CONFIDENCE
Date: Wednesday, 1 June 2022 4:41:48 pm

Hi Ken and Susan,
Just checking your bottom-line figure – we are receiving nearly \$586k per annum, CPI adjusted each year. Is that the figure you need to be using?
Cheers, Dean

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Wednesday, 1 June 2022 4:28 pm

To: Dean Nelson <dnelson@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Nicki Atkinson <natkinson@doc.govt.nz>; Richard Maloney <rmaloney@doc.govt.nz>

Cc: Adrian Gilby <agilby@doc.govt.nz>

Subject: Fwd: Waitaki HEP Bottom Line - DOC-7031836 (2) IN-CONFIDENCE

Dear all. I received the attached, counter factual, from Susan and Herb this pm. This is provided on a privileged, in- confidence basis, as additional context for tomorrow.

Thanks Ken

Sent from Workspace ONE Boxer

----- Forwarded message -----

9 (2) (h)

[REDACTED]

Mon	Tues	Wed	Thurs	Fri
✓	✓	✓	✓	✓

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Thank you.

Yes that's fine, as long as it is kept internal to DOC, to maintain privilege.

Ken

9 (2) (h)

Thank you.

From: [Susan Newell](#)
To: [Ken Hughey](#); [Karina Morrow](#)
Cc: [Herb Familton](#)
Subject: Waitaki HEP Bottom Line - DOC-7031836 (2)
Date: Wednesday, 1 June 2022 3:24:08 pm
Attachments: [Waitaki HEP Bottom Line - DOC-7031836 \(2\).docx](#)

9 (2) (h)

[REDACTED]

Mon	Tues	Wed	Thurs	Fri
✓	✓	✓	✓	✓

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From: [Richard Maloney](#)
To: [Ken Hughey](#)
Cc: [Dean Nelson](#); [Nicki Atkinson](#); [Colin O'Donnell](#); [Hughey, Kenneth](#); [Karina Morrow](#); [Herb Famliton](#)
Subject: FW: Ken's view of the world - 30 May 2022
Date: Wednesday, 1 June 2022 12:21:29 pm
Attachments: [Ken's view of the world - 30 May 2022.docx](#)
[Approximate current costs Waitaki catchment June 2022.xlsx](#)

Hi Ken

Wasn't sure if you actually wanted a response to this, so I haven't commented on your text. I have had a look at the \$\$ contributions you have listed – its not clear yet what this list is supposed to represent with regard to combinations of current, ongoing, regular costs, but it does seem to be missing a number of relevant things.

Therefore, I have taken your list, and put it into excel, and have added the most obvious gaps (still needs to add int the ones that you may get from Nicki and others in Bio Gp via your request). There are some missing values that it would be useful for you and Dean to colate to complete this.

Hope that helps.

Cheers

Richard

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Tuesday, 31 May 2022 11:21 am

To: Dean Nelson <dnelson@doc.govt.nz>; Nicki Atkinson <natkinson@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Richard Maloney <rmaloney@doc.govt.nz>

Cc: Adrian Gilby <agilby@doc.govt.nz>; Aaron McKay <aamckay@doc.govt.nz>; Hughey, Kenneth <[REDACTED]>

Subject: Ken's view of the world - 30 May 2022

Hi Team – please find attached a think piece as a starter for Thursday. This is not meant to be the definitive view of the world, but hopefully something to respond to.

Note I will not be at tomorrow's catch up meeting, and that after our workshop on Thursday I am heading off to meet with the 3 papatipu runanga at 1pm

Thanks and looking forward to Thursday morning.

Ken

Kia ora everyone – my brain is hurting! Just some of Ken's thoughts as a starter for Thursday

Reminder context:

- The two generators and DOC are working over a roughly 2-month time period (and it will be a bit longer, hopefully) to determine whether a side agreement to the Waitaki HEP resource consenting process can be achieved.
- Together we have agreed that "The parties (the Department of Conservation, Meridian Energy and Genesis Energy) will work towards an agreement ... that will achieve ecologically [and culturally] enduring biodiversity conservation outcomes. **This is in response to the ongoing ecological effects of the operation of the Waitaki Power Scheme and Tekapo Power Scheme that will exceed any likely outcome from the resource consenting process (including the Environment Court).**"

In a nutshell, and reflecting on some earlier work I was not a party to:

- From the start of my involvement, I have been focused on outcomes, and that is how we have built the negotiation process with the 2 companies. This is the form follows function approach, which differs to the earlier approach which seemed to me to be largely about the money. **Acknowledging the latter, it has always been clear to me that we are not going to, in reality, get \$18m per annum from the generators that some think we should, either through negotiation or through the consenting process** – BUT IF YOU DISAGREE, PLEASE TELL ME! Further – even arguing for such in a negotiation would be counter-productive.
- Indeed, from **an incoming resource perspective I have real doubts we will get to \$4m per annum (which was the first bottom line I saw)**, but hopefully I am wrong?
- What the above means is that with the current offer of around \$1.2-1.3m pa, and our biodiversity outcome scenarios being \$3, 5 and 10m operating per annum, then it is likely we will struggle to get to even the \$3m pa – but I don't know yet and I have my fingers crossed. So, the question then is **what is our absolute outcome and resource bottom line**, that if we achieved would still be good for biodiversity and still exceed whatever we might realistically expect from going through the consenting process?
- Related to the above is another issue. For some time I have painted a picture, which the generators have painted also to me, that we want to understand what we are investing and what others also are investing currently. **They see their investment (while still called mitigation) as being a part of the bigger picture**, and so do I (and my reasoning is partly explained below). This is a really important issue we need to work through and understand.

Some more context:

- The Waitaki power scheme that we know today was **begun with the commissioning of Lake Waitaki in 1934** – it effectively split the river in two and halted upstream fish migration which has been **hugely detrimental to long-finned tuna in particular**, but likely also for other native fish. **It has had other ecological consequences which we are reasonably clear about.**
- But even then, in 1934, and we do have some direct evidence and relevant comparative information from other rivers like the Rakaia (e.g., have a read of Stead's 1932 classic 'The life history of NZ birds'), human induced pressures were already occurring and having an impact on key native bird species, e.g., woody weeds (especially lupin) were becoming well established and some mammalian predators were invading habitats and already destroying whole bird colonies. **THUS, WITHOUT THE HYDRO DEVELOPMENT THE WAITAKI WAS ALREADY HEADING DOWN A SIMILAR PATHWAY TO OTHER BRAIDED RIVERS AND SPECIES LIKE BLACK STILT WOULD LIKELY BE NATIONALLY CRITICAL EVEN WITHOUT THE SCHEME.**
- Having said this Lake Waitaki and the other dams (Aviemore and Benmore) also **drowned wetlands and other habitats – these are lost forever**. And they have forever changed the

flow and sediment regime of the lower Waitaki – it is now much more stable, and the woody weed problem is hugely worse, as to is predation from a variety of sources.

- But, the much more recent developments in the upper catchment: the canals, the managed lake levels of Pukaki and Tekapo, and the river (Tekapo, Pukaki and Ohau) diversions, have greatly increased the direct impacts – woody weed spread on the Tekapo, large no flow reaches along the Tekapo, Ohau and Pukaki rivers, and significant lake level fluctuations especially for Pukaki and Tekapo, have together hugely reduced habitat availability and quality and have greatly increased predation of birds and terrestrial insects and lizards. And there are impacts on species and habitats caused by the canals which directly impact on connectivity.
- With all of this context then we can build two pictures: the WITHOUT HEP picture, and the WITH HEP picture – given the above and DOC's biodiversity conservation mandate it is clear that even WITHOUT HEP, significant conservation investment would have been required to conserve key species and habitats, but likely hugely less than today.

The WITHOUT HEP biodiversity conservation investment need:

- Woody weed control would be required on the lower Waitaki and also on the Ahuriri and Tekapo. The Ahuriri is suffering without the impact of HEP and the Tekapo, because of the lake, would likely have had a growing woody weed problem needing investment.
- Predator control would still be needed but probably not to the extent required today. The work of many, mostly DOC researchers, demonstrates the importance of river flow in dynamic braided river environments in helping protect birds (and likely also insects and lizards) nesting on islands from mammalian predators. Any flow helps but the higher the flow the larger the extent of protection (O'Donnell's work on black-front tern shows this, indirectly).
- Other habitat protection work, e.g., wetlands, would still be required because farming, including recent intensification, was already a significant pressure on these areas.

The WITH HEP biodiversity conservation investment need

- We need to support the papatipu runanga to continue to grow long-finned tuna recovery in the upper catchment – this is totally within the ambit of WITH HEP and thus should be 100% funded as planned in the scenarios. Most of the other native fish work is linked directly to WITH HEP impacts (e.g., via canal related connectivity issues), but can likely be reduced in discussion with Ngai Tahu.
- The woody weed problem is immense on the lower Waitaki and is very significant on parts of the Tekapo and much worse as a result of HEP development. My guess, especially given some of the stabilising effects of dams on the lower Waitaki, and of the operating regime applying to the Tekapo, is that it is 2-3x as bad as the WITHOUT HEP situation. Assuming this is the case we can easily calculate the WITH HEP vs WITHOUT HEP COST (and this is seen in the 3 scenarios we have prepared, each reduced by ½ or 1/3rd – I prefer the latter). There will be direct benefits for birdlife, lizards and probably terrestrial insects with effective and significant woody and related weed control.
- The woody weed problem is also impacting on neighbouring wetlands along both sides of the lower Waitaki and along parts of the lower Ohau and Tekapo – I'm not sure how to calculate this but maybe lump it with the above.
- Woody weeds also help drive predation impact, i.e., they harbour prey such as rabbits on islands which are hunted by mammalian predators which also prey on desired native species – the costs of predator control are therefore linked to woody weed control but also to the effects of reduced rivers flows. For the lower river therefore, the cost is the cost as per the scenarios presented. Upstream there would have been predator control for black stilts but probably not to the extent now undertaken and almost certainly less for other species. The

calculation problem here is that loss of habitat (no flows in rivers), etc., has greatly exacerbated need and therefore the predator control planned should be that identified in the scenarios, at least for the Tekapo, Ohau and Tasman, as mitigation for what is now lost. Associated and targeted work on the Ahuriri is complementary and funding should be as per the scenarios.

- Habitat loss is significant and of course both direct and indirect. With the loss of river flows there is also other riparian habitat deterioration. A case can be mounted therefore for wetland restoration, especially along the Tekapo river and environs, as envisaged in the scenarios. **Most of this investment should come from the generators as most of the loss is directly attributable to the scheme, as envisaged in the scenarios.** So, what might an investment look like?

A 'partnership' approach to the mitigation opportunities:

- From the above we can see that even without a hydro scheme, and all other things being roughly equal, we would still be investing significantly into aspects of the Waitaki and its biodiversity. If we add the HEP impacts, then clearly there is a case for a shared approach to the work. And, as noted, the generators are seeing an opportunity to work with others to build the biodiversity conservation opportunity here in a cost-effective way – personally I agree with this approach.
- So, based on the above I can envisage an opportunity emerging which looks a bit like:
 - o Zone 1: Lower Waitaki – Meridian and [REDACTED] working together to support DOC achieve significant active riverbed island and riparian wetland gains – birds and native fish will gain. DOC invests time while operational costs are covered by other partners.
 - o Zone 2: Ahuriri et al – Meridian and [REDACTED] and DOC partner to achieve exemplar sites on the lower Ahuriri, with DOC investing in its black stilt and related work. The tuna catch and carry programme is enhanced and benefits all zones
 - o Zone 3a: Tasman et al – Meridian and DOC work together as per now on the Tasman, but with some additional work around the lake
 - o Zone 3b: Pukaki, Ohau et al – Meridian works with DOC on exemplar sites
 - o Zone 4: Tekapo catchment – Genesis and [REDACTED] and [REDACTED] partner with DOC for Tekapo and related woody weed control, while Genesis and DOC work on native fish and predator control, and also on riparian wetland protection especially in the Grays
 - o Overall – ongoing applied research to fill knowledge gaps and improve delivery cost effectiveness.

The sum of current investments, roughly speaking, in 2021-22, is in the order of (noting I am still firming up on this):

- [REDACTED] \$750800k, mostly in the TMA area but linked to rivers and weeds
- [REDACTED] DOC rabbit control in Tekapo, Ohau, Pukaki, Tasman, Ahuriri, Godley riverbeds
- DOC - \$??? pa largely for the kaki programme
- DOC/TMA/Uni – robust grasshopper/Tekapo weta - \$130k fence \$10k
- DOC/Universities, [REDACTED] – braided river (Holly=\$10k [REDACTED] BRI) research in Mackenzie (Bfters, Cals and Tasman River \$42k incl \$10pr, Invertebrates) = ~\$300k including Uni in-kind and scholarship contributions
- Tekapo weta - 10% Tara
- Grasshopper surveys - 10% Tara
- 2 MSc per annum Tara
- Tasman invert ref collection – PRR [REDACTED] Tu Te Rakiwhanoa \$20k per annum
- 66% of outcome monitoring hedgehogs
- 33% trapping sites hedgehogs

- this is just the weeds and river works budget? - \$178k pa
- fish weirs / wetland protection fencing
- nutrient monitoring in Mackenzie Rivers
- Meridian (via PRR) = \$600k pa and with =
- Genesis (with = ??? and via PRR = \$150k pa
- Shouldn't we be including the crown tenure review costs for land purchase for wetlands and riverbed areas in the Mackenzie (eg Cass River from Godley Peaks, Upper Ahuriri River, Mt Gerald Wetland) – this would something like \$1500ha x ?2000-5000/ha = min of \$3-\$7.5mill

Here's a more complete table – I've attached it to the email

Work type	Work	Per annum	Significant recent one-offs	Notes
Weeds	river weed work JAN funded via TMA	\$800 000		
Rabbits	DOC rabbit control in Tekapo Ohau Pukaki Tas	\$600 000	Dean can you check total ha and	Costs are \$150/ha (aerial 1080) over about 20000 ha
Species mgmt	Doc kaki programme	Dean		
Research and management	DOC/TMA/Uni Predator fence insects	\$10 000		\$130 000 one-off was recent fence build
Research and management	DOC/Uni River dynamics research Cass	\$110 000		includes \$10k DOC support University in-l d
Research and management	DOC/Uni/PRR black fronted tern movements research	\$80 000		Excludes \$20k PRR
Research and management	DOC/PRR River terr invertebrate sampling	\$40 000		Excludes \$10k PRR
Research and management	DOC grasshopper and weta field and advice	\$20 000		TSU time
Monitoring	PRR grasshopper annual surveys	\$0		Costs in PRR line below
Research and management	DOC/PRR Tu Te Rakiwhanoa Mackenzie rivers in	\$20 000		Excludes \$10k PRR
Research and management	DOC hedgehog impacts on invertebrate/lizard resear	\$60 000		Calculated as 40% of total project costs (4 of sites fi
Weeds	Weeds and river works operation budget?	\$178 000		
Species mgmt	DOC fish weirs	Dean		
Monitoring	nutrient river monitoring	Ken		
	Other costs from TSU FW Threats Bio teams	Ken requested		
	DOC/farmer River fence maintenance - Tekapo ?			
PRR weeds and predator	Meridian via PRR	Dean		This is the PRR work
PRR weeds and predator	Genesis via PRR	Dean		This is the PRR work
What is this work Ken?	Meridian with	Ken		
What is this work Ken?	Genesis with	Ken		

We can use this investment, and 'perceived' outcomes, as a starting point to assess against the realistic desired outcomes and investment required to achieve these – this is work for the negotiation team.

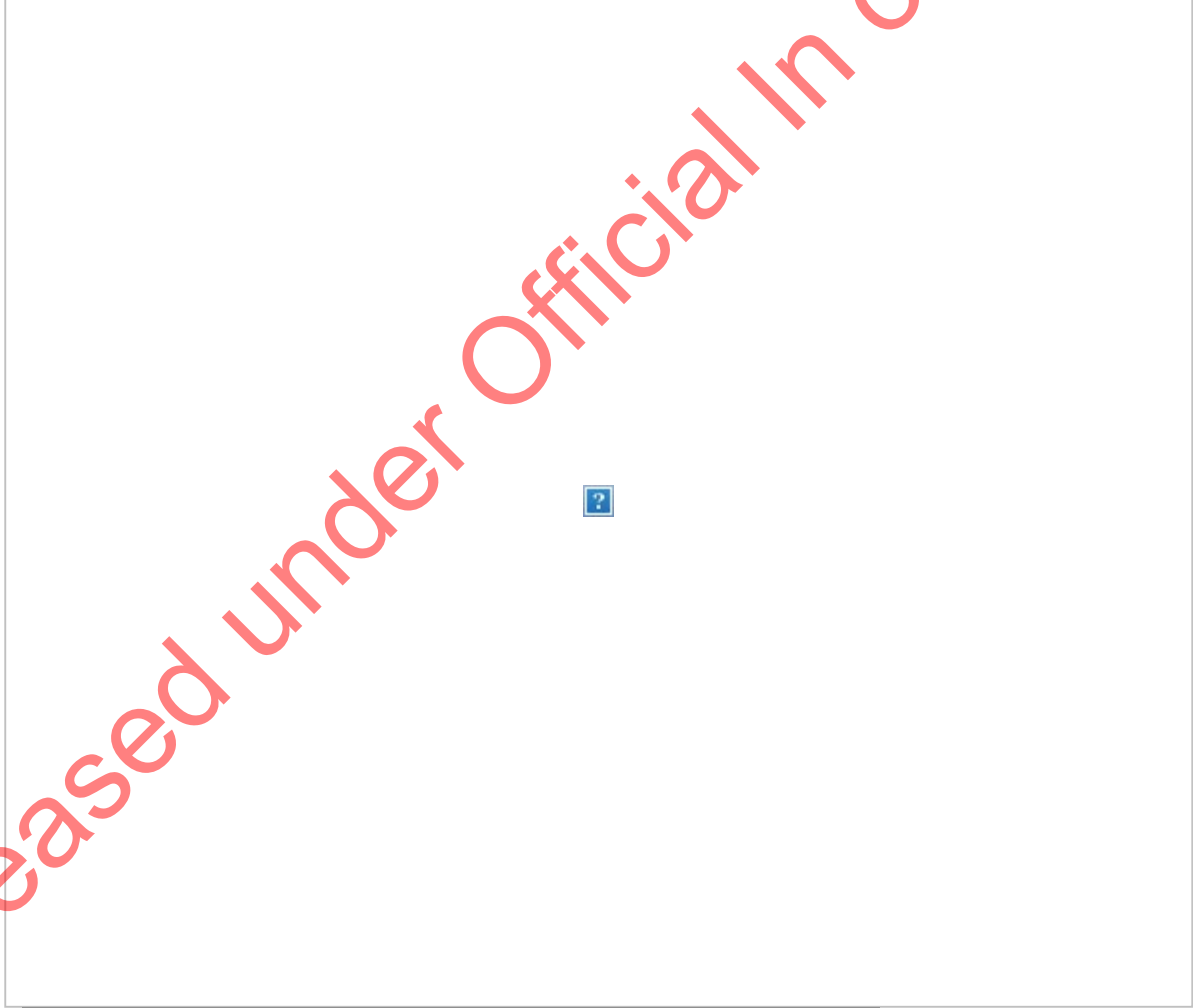
Commented [RM1]: Three things to consider

1. Past investment as been spiky, so it may be more useful to look at longer-term contributions
2. Current investment is not necessarily an indication of the required investment to achieve outcomes (eg Tekapo river weed control is no sufficient at present)
3. We have chosen to invest in other rivers away from the Mackenzie because PRR exists and was funding work (e.g.,

From: [Herb FAMILTON](#)
To: [Ken Hughey](#); [Karina Morrow](#)
Subject: Waitaki Paper
Date: Wednesday, 1 June 2022 11:41:21 am

9 (2) (h)

[Redacted text block]



	Mon	Tues	Wed	Thurs	Fri
am	✓	✓	✓	✓	✓
pm	✓	✓		✓	

✓ = In the office;
= Working remotely;

From: [Dean Nelson](#)
To: [Ken Hughey](#); [Karina Morrow](#)
Cc: [Jo Macpherson](#); [Richard Maloney](#)
Subject: [REDACTED] weed costs in PRR area
Date: Monday, 23 May 2022 2:58:10 pm
Attachments: 9 (2) (j) [REDACTED] weed control that relates to PRR area.xlsx

Hi Ken,

As a beginning, I have managed to get my hands on most of the [REDACTED] invoices for weed control in the areas traditionally covered by PRR. I have excluded any sites and species that are 9 (2) (j) specific, and it includes some stream/river sites with (in particular) lupins and broom that are seed sources leading into other key rivers and lakes. Note that 9 (2) (j) are running out of funds for weed control so PRR will pick up most of the rest of the work to be done (see last row in spreadsheet) and there maybe another \$60k to be spent in these areas before the end of FY. Obviously, this is more than what PRR used to spend on weed control in these areas, but it illustrates what needs to be spent to get on top of the weed problem. Obviously, also at this stage, it doesn't include PRR, DOC, 9 (2) (j) funded weed control in other areas but I will collate what I can for those. Just thought it was interesting to see what is getting spent in those upper catchments. This is just weed control and doesn't include anything else, particularly predator control.

Cheers, Dean

Costs of work undertaken in Mackenzie basin 2021-22

Date	Description	Site	Method	Contractor/staff	Who paid	Cost (excl GST)
13/05/2022	Lupin control	Upper Fork Stream	Contractor ground spray			\$ 1,738.00
27/04/2022	Lupin and broom	Lower Fork Stream	Contractor ground spray			\$ 1,961.00
3/05/2022	Lupin control	Lake Pukaki eastern side	Contractor ground spray			\$ 9,666.00
8/05/2022	Willow control	Macaulay River	Contractor chainsaw			\$ 29,261.00
2/05/2022	Willow control	Lower cass	Contractor chainsaw			\$ 2,592.00
22/04/2022	Willow control	Coal River	Contractor chainsaw			\$ 962.00
29/03/2022	Willow control - transport crews	Godley delta/Tasman	Helicopter transport			\$ 8,360.00
10/04/2022	Willow control	Coal River	Contractor chainsaw			\$ 862.00
16/02/2022	Willow control - transport crews	Godley delta	Helicopter transport			\$ 7,590.00
4/03/2022	Willow control	Coal River	Contractor chainsaw			\$ 34,180.00
19/02/2022	Willow and some broom control	Coal River, Godley and Jollie	Contractor chainsaw and spray			\$ 26,251.00
12/02/2022	Willow and some broom control	Coal River and Lake Tekapo	Contractor chainsaw and spray			\$ 32,865.00
16/01/2022	Weed control	Godley delta	Aerial spray			\$ 10,260.00
21/01/2022	Willow control - transport crews	Godley delta/Tasman	Helicopter transport			\$ 18,342.00
29/01/2022	Willow and some broom control	Coal River and Lake Tekapo	Contractor chainsaw and spray			\$ 27,502.00
30/04/2022	Lupin control	Fork Stream?	Aerial spray			\$ 5,085.00
6/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 3,237.00
3/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 9,666.00
5/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 2,165.00
26/04/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 2,459.00
10/03/2022	weed control and transport crews	Tasman delta	Aerial spray and transport			\$ 9,010.00
19/03/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 10,700.00
19/03/2022	Lupin Control	Mt Cook - Hooker flats	Contractor ground spray			\$ 6,636.00
18/03/2022	Lupins and willows	Cass River/Fork Stream	Contractor ground spray			\$ 4,222.00
15/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 789.00
22/03/2022	Lupin control	Tasman River	Contractor ground spray			\$ 1,183.00
22/03/2022	Lupin control	Olivia fan	Contractor ground spray			\$ 1,101.00
12/03/2022	Lupin Control	Mt Cook - Hooker flats	Contractor ground spray			\$ 10,483.00
12/03/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 17,689.00
11/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 1,842.00
8/03/2022	Lupin control	Lake Pukaki eastern side	Contractor ground spray			\$ 9,713.00
4/03/2022	Lupin control	Lake Pukaki eastern side	Contractor ground spray			\$ 21,160.00
4/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 3,800.00
26/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 18,117.00
27/02/2022	Lupin control	Tasman River	Contractor ground spray			\$ 2,706.00
25/02/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 4,063.00
21/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 35,370.00
24/02/2022	Lupin control	Tasman River	Contractor ground spray			\$ 3,514.00
17/02/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 5,284.00
13/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 14,753.00
12/02/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 5,587.00
9/02/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 5,148.00
30/01/2022	Lupin control	Tasman River	Contractor ground spray			\$ 3,393.00
22/01/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 43,576.00
9/02/2022	Lupin control	Mistake Creek	Contractor ground spray			\$ 4,636.00
17/01/2022	Lupin control	Mistake Creek, Fork Stream, Godley delta	Contractor ground spray			\$ 4,164.00
16/12/2021	Lupin control	Tasman	Contractor ground spray			\$ 6,124.00
22/01/2022	Lupin Control	Irishman Creek	Contractor ground spray			\$ 31,858.00
24/01/2022	Lupin, broom and willow control	Tasman River	Contractor ground spray			\$ 3,540.00
16/01/2022	Lupin, broom and willow control	Tasman River	Contractor ground spray			\$ 2,991.00
17/12/2021	Lupin Control	Irishman Creek	Contractor ground spray			\$ 5,695.00
15/12/2021	Lupin, broom, willow control	Tasman, Hooker	Contractor ground spray			\$ 6,124.00
16/12/2021	Weed control	Jollie delta, Tasman River	Aerial spray			\$ 21,060.00
23/12/2021	Lupin, broom and willow control	Tasman River	Contractor ground spray			\$ 1,348.00
14/12/2021	Lupin and willow control	Tasman River, Coal River	Contractor ground spray			\$ 5,835.00
14/12/2021	Lupin and willow control	Cass River	Contractor ground spray			\$ 2,053.00
14/12/2021	Lupin Control	Irishman Creek	Contractor ground spray			\$ 22,666.00
5/12/2021	Lupin Control	Irishman Creek, Mt Cook	Contractor ground spray			\$ 40,547.00
24/11/2021	Lupin control	Coal River	Contractor ground spray			\$ 5,784.00
30/11/2021	Lupin control	Whale Stream	Contractor chainsaw and spray			\$ 27,502.00
18/05/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 2,202.00
27/04/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 1,961.00
31/03/2022	Weed control	Godley delta, Coal River, Jollie River	Aerial spray			\$ 20,570.00
3/04/2022	Weed control	Godley Hooker rivers	Contractor ground spray			\$ 4,736.00
31/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 4,009.00
25/03/2022	Weed control	Fork Stream, Cass River	Contractor ground spray			\$ 4,357.00
23/03/2022	Lupin control	Fork Stream	Contractor ground spray			\$ 1,946.00
19/03/2022	Willow control	Coal and Tasman Rivers	Contractor chainsaw and spray			\$ 12,868.00
31/03/2022	Weed control	Godley, Cass and Tasman Rivers, Mistake Creek	Aerial spray			\$ 14,280.00
9/03/2022	Lupin, alder and willow control	Tasman River	Contractor ground spray			\$ 2,276.00
6/02/2022	Lupin, broom control	Coal River, Lake Tekapo	Contractor ground spray			\$ 11,795.00
6/02/2022	Gorse, broom control	Coal River	Contractor ground spray			\$ 17,183.00
17/01/2022	Chemical					\$ 20,811.00
6/01/2022	Lupin, broom, alder and willow control	Tasman, Jollie River	Contractor ground spray			\$ 2,974.00
30/11/2021	Lupin, broom, alder and willow control	Jollie River, Olivia	Contractor ground spray			\$ 5,844.00
9/12/2021	Weed control	Tasman and Jollie Rivers	Aerial spray			\$ 17,460.00
24/11/2021	Gorse, broom, lupin control	Coal River, Washdyke Stream	Contractor ground spray			\$ 9,055.00
26/11/2021	broom control	Jollie River	Contractor ground spray			\$ 6,000.00
14/11/2021	Lupin broom control	Jollie River	Contractor ground spray			\$ 4,247.00
20/05/2022	Willow control	Coal and Godley Rivers	Contractor chainsaw and spray		PRR	\$ 14,122.00
						\$ 845,036.00

From: [Richard Maloney](#)
To: [Karina Morrow](#)
Cc: [Ken Hughey](#); [Dean Nelson](#)
Subject: RE: Waitaki negotiations weekly meeting
Date: Wednesday, 11 May 2022 3:50:30 pm
Importance: High

Hi Karina

I didn't have an invite in my calendar for that one today, so missed it altogether ..sorry about that.

Had a long talk with Ken on Tuesday about next steps. Here's some bullets, and noting this doesn't entirely line up with what Jo said below about what data was required...

1. Ken has asked [REDACTED] for Lower Waitaki river management costs – he will follow up on that.
2. We talked about why costs were needed. Meridian and Genesis were interested in seeing what costs others spent, and therefore what contributions they could make, so that the energy company resource could be put elsewhere / supplement this. We discussed the following points about this approach:
 - a. This would lead to a potential side agreement on this side agreement (ie we are reliant on others to provide resources that are not tied to the consenting conditions). This is risky and we should avoid this.
 - b. We strongly believe that the conversation is about what values have been impacted by energy company water use, and the package should reflect a fair improvement to those values – paid for by the companies – regardless of who else is working in the area, or on who may intend to work there in the future. Otherwise, others are subsidising their consented operational impacts.
3. Based on (2), at the moment Ken and I agreed that there is nothing extra we need to do to supply to Ken and yourself until after your next session with the companies which should focus on getting a more realistic offer for resources to deliver on the range of values impacted.
4. At some time in the future, it may be that we will need to tally up the total amount of work done in braided rivers, but in that case, we will be suggesting that this includes a much wider look at whose resources have been allocated where – an example is that the [REDACTED] money that comes to DOC (~\$250k per annum) into braided river work in Canterbury, has largely been spent outside the Mackenzie, because PRR funds are already covering some of the costs of some work in that area already – otherwise they would have contributed funds to Mackenzie questions. This level of prioritisation means we would want to take a very wide look at what other resources should be included.
5. If you wanted to get a head start on point (4), then Dean could start to look at the following – but again, not seeing an immediate urgency on this:
 - a. Sum of all costs for weed control contributions from [REDACTED] and DOC for each zone- eg Tekapo, Twizel, Ohau, Ahuriri etc (not Zone 1, the Lower Waitaki that Ken will do)
 - b. [REDACTED] expected total costs annually for next 5 years – we will apportion the riverbed area as a % of total [REDACTED] area (Richard to get from Simone/Stephen).
 - c. [REDACTED] JFN funding for weeds in [REDACTED] space, and in Dobson etc
 - d. Wilding pine control broad per ha costs for all of the Mackenzie, on the basis that the river areas would have been increasingly impacted by pine spread (eg in the Pukaki Riverbed)
 - e. Willow control costs outside those that [REDACTED] will cover in (c).
 - f. Any non-PRR predator control and habitat management costs (eg kaki, community

trapping areas)

- g. Any [REDACTED] and other funds (eg [REDACTED] supporting wetland protection and native fish protection in the Waitaki catchment
- h. Any research money and in kind contributions outside of PRR address research gaps related to braided rivers, wetlands, braid plains, and threatened species in these areas (Richard to do this one).
- i. Any other qualifying costs I might have missed?

Happy to discuss any of this further with Dean or you. I think some of this will be hard to get to an accurate level, and I think that ballpark figures will be okay, so long as we are consistent in how we collect these (e.g., as a per annum figure, opex only costs etc).

Cheers

Richard

From: Karina Morrow <kmorrow@doc.govt.nz>
Sent: Wednesday, 11 May 2022 2:54 pm
To: Richard Maloney <rmaloney@doc.govt.nz>
Subject: FW: Waitaki negotiations weekly meeting
Importance: High

Hi Richard

Re the below. I've just met with the working group (Dean N and Nicki Atkinson attended) to explain the further work required below. I said I would touch base with you to see if you need anything from them to put the further info together?

Let me know if you need any support to put this together

Karina

From: Jo Macpherson <jmacpherson@doc.govt.nz>
Sent: Wednesday, 11 May 2022 9:29 am
To: Herb Familton <hfamilton@doc.govt.nz>; Ken Hughey <khughey@doc.govt.nz>; Karina Morrow <kmorrow@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Dean Nelson <dnelson@doc.govt.nz>; Susan Newell <snewell@doc.govt.nz>; Cassie Mealey <cmealey@doc.govt.nz>; Hughey, Kenneth <9(2)(a)> Michael Hayward <mhayward@doc.govt.nz>; Nicki Atkinson <natkinson@doc.govt.nz>
Cc: Richard Maloney <rmaloney@doc.govt.nz>
Subject: Waitaki negotiations weekly meeting

Kia ora

Just letting you know that Ken and I are both unable to attend today's meeting, we both have other commitments which we are unable to get out of, so apologise for not being there. Karina will take a lead on our behalf.

I have also asked Karina to step in with Ken and be around the negotiation table from now on. I will also be present, however my capacity is now significantly reduced as a result of moving into the Directors role.

As an up-date for you, Ken and Richard and others have been working, really hard to provide a biodiversity enhancement package that we can use in our Waitaki negotiations with the energy companies. We want to thank Richard in particular for his amazing support here. On Thursday last week Ken provided this material to the companies, without the costs, and on Friday we had a very long face-to-face meeting at DOC in Christchurch. Ken led them through the entire package and associated scenarios and presented estimated costs for each. 9 (2) (i)

[REDACTED]

[REDACTED]

[REDACTED]

One thing we are doing is attempting to quantify the nature, including the costs, of existing biodiversity related work on the Waitaki system (including that spent by [REDACTED] and [REDACTED] and trying to clarify which work in the package is already being undertaken, e.g., a lot of the 'woody weed' in river work. In order to catch our breath we have agreed not to meet this week but instead complete this work and to meet on the week of 16 May. Karina will discuss this today.

The other big development is that Ken and I met with the 3 papatipu runanga on Thursday. This hui was very encouraging and we are committed to further joint work over the next few weeks/months. Karina, I will ask that you be involved in future work with Runaga as well.

Ngā mihi

Jo Macpherson

Kaihautū, Matarautaki (Director for Operations) Eastern South Island

Department of Conservation – *Te Papa Atawhai*

9(2)(a) [REDACTED]

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From: [Richard Maloney](#)
To: [Ken Hughey](#)
Subject: RE: indirect costs for programme management
Date: Friday, 6 May 2022 2:49:06 pm

Give me a call when you're free. I'd be keen to hear how it went, and what resets we might need.

Sent from Workspace ONE Boxer

On 6/05/2022 2:42 pm, Ken Hughey <khughey@doc.govt.nz> wrote:

9(2)(i)

From: Richard Maloney <rmaloney@doc.govt.nz>

Sent: Friday, 6 May 2022 11:58 am

To: Ken Hughey <khughey@doc.govt.nz>

Subject: RE: indirect costs for programme management

No costs in scenario 1 because the braid plain has been managed – ie all the islands are done as part of the whole of river mgmt.

(in Waitaki we built some islands in scenario 1 because we thought it would take awhile to achieve clearance for the whole river – different in Tekapo because bulldozing is easier and river is smaller...).

Okay?

R

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Friday, 6 May 2022 11:49 am

To: Richard Maloney <rmaloney@doc.govt.nz>

Subject: RE: indirect costs for programme management

Richard. Urgent. Zone 4 tekapo. Scenario 1 Island creation and replacement what are figures

Sent from Workspace ONE Boxer

On 6/05/2022 10:30 am, Richard Maloney <rmaloney@doc.govt.nz> wrote:

Not unless you are really s uck ...

15% contingency (ie work on the ground costs)

15% indirects (programme mgmt, office support etc.)

We could make it be part of the 15% indirects, and given the size of the overall budget that might work. To run this amount of work is a several person team at \$100k pp = 700k – 1mill pa for staff costs alone.

At \$10mill directs = \$13mill total. That is \$1.5mill for indirects. Take off half of that for staff costs, doesn't leave much for office support, or DOC overheads (i.e., <7%, doubt CSG will be too happy with that).

It would be safer to say that the tables we have provided are direct work costs. Contingency will be set at an average of 15% (will be higher for some things – eg building costs, anything involving transport and fuel), and that indirects are still being confirmed but will be around 15% for programme indirects, and 15% for DOC national indirects.

Its normal to add these. Be good to get advise / check in at some stage with national accountant group in CSG to confirm this approach.

Cheers

Richard

From: Ken Hughey <khughey@doc.govt.nz>

Sent: Friday, 6 May 2022 9:42 am

To: Richard Maloney <rmaloney@doc.govt.nz>

Subject: indirect costs for programme management

Richard. Does the 30% do that?

Sent from Workspace ONE Boxer

On 6/05/2022 9:34 am, Richard Maloney <rmaloney@doc.govt.nz> wrote:

Hi Ken and Jo

I think we should be clear that we mean the indirect 15% we have included is for Programme level indirect costs = programme management, direct staff costs, accommodation, training, office supplies etc, and not for DOC's national overheads. We should expect that DOC nationally will want to add in their corporate overheads as standard practise.

Otherwise, we will need to build in those programme indirects as a direct cost into each line item or Zone – a messy way to split this up.

Currently we haven't provided for the programme management level / offices etc to make this project work within each of the zone line items.

Cheers

Richard

Dr Richard Maloney

*Principal Technical Advisor – Biodiversity Group
Department of Conservation,*

265 Princes St, Dunedin 9016, New Zealand

ph +64 (2) (a)

e-mail rmaloney@doc.govt.nz

From: [Richard Maloney](#)
To: [Ken Hughey](#)
Subject: RE: indirect costs for programme management
Date: Friday, 6 May 2022 11:58:05 am

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265 Princes St, Dunedin 9016, New Zealand

ph +64 9(2)(a) [REDACTED]

e-mail rmaloney@doc.govt.nz

Released under Official Information Act

From: [Richard Maloney](#)
To: [Ken Hughey](#)
Subject: RE: indirect costs for programme management
Date: Friday, 6 May 2022 10:30:13 am

Not unless you are really stuck ...

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We could make it be part of the 15% indirects, and given the size of the overall budget that might work. To run this amount of work is a several person team at \$100k pp = 700k – 1mill pa for staff costs alone.

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Currently we haven't provided for the programme management level / offices etc to make this project work within each of the zone line items.

Cheers

Richard

*Dr Richard Maloney
Principal Technical Advisor – Biodiversity Group
Department of Conservation,*

265 Princes St, Dunedin 9016, New Zealand

ph +64 9 (2) (a)

e-mail rmaloney@doc.govt.nz

From: [Richard Maloney](#)
To: [Ken Hughey](#); [Jo Macpherson](#)
Subject: indirect costs for programme management
Date: Friday, 6 May 2022 9:34:55 am

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Richard

Dr Richard Maloney
Principal Technical Advisor – Biodiversity Group
Department of Conservation,
265 Princes St, Dunedin 9016, New Zealand
ph +9 (2) (a)
e-mail rmaloney@doc.govt.nz

From: [Richard Maloney](#)
To: [Ken Hughey](#)
Subject: Scenarios for levels of value management in all of Waitaki Catchment_SUMMARY.xlsx
Date: Thursday, 5 May 2022 8:26:06 pm
Attachments: [Scenarios for levels of value management in all of Waitaki Catchment_SUMMARY.xlsx](#)
Importance: High

Hi Ken

Here's the excel spread sheet. Not in DOCCM yet, because I haven't figured that out on my machine yet ...

Red tabs – the costs and summary of work

Orange tabs – one for each zone, the targets for each scenario

Blue tabs – my workings for the calculations in the red tabs

Hope that all makes sense – about as good as I can get given not much time to work on this. I can see a few gaps, the fish reserve is partially covered but might need more ...

Regardless – the test of the money in the scenarios still feels okay to me – we will do substantive work if we land scenario 1, or perhaps a combo of some scenario 1 and some scenario 2.

Scenario 3 is less than satisfying and will not deliver.

Cheers

Richard

Average annual direct costs Scenario 1

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 3,500,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,900,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,950,000
	TOTAL average annual direct cost	\$ 9,950,000

Average annual direct costs Scenario 2

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 1,650,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,850,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,850,000
	TOTAL average annual direct cost	\$ 6,850,000

Average annual direct costs Scenario 3

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 700,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 650,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 500,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,250,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 900,000
	TOTAL average annual direct cost	\$ 3,900,000

Scenario 1 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	\$ 4,550,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 700,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,450,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 3,850,000
	TOTAL average annual direct + indirect cost	\$ 12,950,000

Scenario 2 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 2,100,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 750,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,400,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,400,000
	TOTAL average annual direct + indirect cost	\$ 8,900,000

Scenario 3 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 950,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 850,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 650,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,600,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,150,000
	TOTAL average annual direct + indirect cost	\$ 5,050,000

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ZONE	ZONE NAME	Key focus of work
ZONE 1	Lower Waitaki, Hakataramea	Restoration of braid plains and side streams, wetland enhancement in catchment including fish and tuna habitat, island creation, weed control and targeted predator control, knowledge gaps filled.
ZONE 2	Ahuriri catchment and lower Lakes	Focussed restoration in key exemplar sites on river with associated weed and predator management, some broadscale river weed management, targeted lake edge weed control, site specific threatened species management, knowledge gaps filled, wetland enhancement in catchment including fish and tuna habitat, tuna restoration via translocation
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	Landscape scale predator management in lower river reaches, spot weed control on rivers and adjacent to native values in lakes, site specific threatened species management, knowledge gaps filled, wetland enhancement in catchment including fish and tuna habitat, tuna restoration via translocation
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	Exemplar sites with predator and weed management in lower river reaches focused on threatened species hotspots, low level weed control adjacent to native values on lakes, side stream restoration, and areas of terrestrial braid plain weeds managed, knowledge gaps filled, wetland enhancement in catchment including fish and tuna habitat, tuna restoration via translocation
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	Restoration of braid plains and side streams, wetland enhancement in catchment including fish and tuna habitat, island creation, weed control and targeted predator control, knowledge gaps filled. Restoration of Bays on Lake, and of wetlands in catchment. Tuna restoration via translocation, Island restoration, spot weed control on lake edges, canal carex plantings, no-flow wetland areas established adjoining canal.

ZONE 1													
Zone short name	Lower Waitaki Hakataramea												
Activity/Area	Lower Waitaki River	Lower Waitaki River	Lower Waitaki River	Lower Waitaki River	Lower Waitaki River	Lower Waitaki River	Lower Waitaki River	Lower Waitaki River	Lower Waitaki River	Lower Waitaki catchment and Hakataramea	Lower Waitaki catchment and Hakataramea	Lower Waitaki catchment and Hakataramea	Lower Waitaki catchment and Hakataramea
Key management actions	island creation (ha)	island replacement (no.)	Braid plain clearance (km)	Weed maintenance - cleared areas (ha)	Small mammal ongoing predator mgmt at cleared areas	Small mammal setup predator mgmt at cleared areas	Black backed gull predator control (no.)	Wetlands cleared (ha)	Wetlands restored planting fencing (ha)	Offsite native fish protection using weirs and pest fish removal (no.)	knowledge gaps filled	Application of key findings from knowledge gaps	Tuna supplementation
Scenario 1	60 islands	6 islands	60 km cleared	1500 ha treated	1500 ha trapped	1500 ha of traps setup	10 colonies	240 ha	240 ha	31 weirs built	invertebrate, lizard and fish knowledge gaps filled	Management applied to all knowledge gaps	Translocation into all key habitats
Scenario 2	30 islands	3 islands	25 km cleared	600 ha treated	600 ha trapped	600 ha of traps setup	8 colonies	190 ha	190 ha	25 weirs built	invertebrate, lizard and fish knowledge gaps filled	Management applied to all knowledge gaps	Translocation into all some key habitats
Scenario 3	15 islands	1.5 islands	8 km cleared	200 ha treated	200 ha trapped	200 ha of traps setup	5 colonies	120 ha	120 ha	15 weirs built	invertebrate, lizard and fish knowledge gaps filled	Management applied to a few knowledge gaps	Translocation into some key habitat

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ZONE 3A									
Zone short name	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau								
Activity/Area	Hopkins/Dobson	Hopkins/Dobson, Tasman catchments	Hopkins/Dobson	Hopkins/Dobson, Tasman	Tasman	Lake Pukaki and Lake Ohau	Lake Pukaki and Lake Ohau	Lake Pukaki Island	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau
Key management actions	Small mammal predator mgmt (km of lines)	Wetlands restored planting, fencing (ha)	Weed maintenance (ha)	Black backed gull predator control (no.)	Maintenance surveillance and residual pest control as per transformational knockdown by [REDACTED]	Weed management on lake edge	Site specific threatened species management	Remove weeds and pests, and restore ecological values	Tuna supplementation
Scenario 1	20 km of trap lines	50 ha wetlands	100 ha treated	2 colonies	9000 ha under surveillance and response	5 km of weed management	5 species sites managed	All pests and weeds managed	Translocation into all key habitats
Scenario 2	20 km of trap lines	30 ha wetlands	100 ha treated	2 colonies	9000 ha under surveillance and response	3 km of weed management	5 species sites managed	Some pests and weeds managed	Translocation into some key habitats
Scenario 3	0	25 ha wetlands	100 ha treated	2 colonies	9000 ha under surveillance and response	1 km of weed management	5 species sites managed	Fewer pests and weeds managed	Translocation into some key habitats

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Zone B		Zone C										Zone D										Zone E										Zone F									
Zone sh/1 name		Pukak, Upper and Lower; Ohau R/ve s and m d-Lakes																																							
Act v ty/1 ea	Lower Ohau R/ve	Lower Ohau R/ve	Lower Ohau, Pukak R/ve s	Lower Ohau, Pukak R/ve s	Lower Ohau, Pukak R/ve s	Lower Ohau, Pukak R/ve s	Lower Ohau, Pukak R/ve s	Upper and Lower Ohau and Pukak Catchments	Upper and Lower Ohau and Pukak Catchments	Upper and Lower Ohau and Pukak Catchments	Upper and Lower Ohau and Pukak Catchments	Upper and Lower Ohau and Pukak Catchments	Pukak Upper and Lower Ohau R/ve s and m d-Lakes	Upper and Lower Ohau and Pukak Catchments	Lake Benmo e, Lake Ruanwh	Lake Benmo e ma g n s	Lake Benmo e islands																								
Key management act ons	Island c eat on (ha)	Island replacement (no.)	8 a d p/a n clea ance (km)	Weed ma ntenance clea ed a eas (ha)	Small mammal ongo ng edo mgmt at clea ed a eas	Small mammal ongo ng edo mgmt at clea ed a eas	Black backed gull p edato cont of (no.)	Wetlands clea ed (ha)	Wetlands clea ed (ha)	Offs te nat ve fsh p lect on edo ng s and pest fsh removal (no. s tes)	knowledge gaps f lled	Appl cat on of key fnd rgs f om knowledge gaps	Tuna supplement on	5 de st eam catchment management (weeds)	Ta gged weed ma nten on (km of sho ed re)	selected fsh es tates spec es management (spec es)	Remove weeds and pests, and sto ecolog cal val es																								
Scenario 1	2 islands	0.5 islands	0 km cleared	800 ha cleared	2000 ha trapped	2000 ha with traps setup	1 colony	40 ha	40 ha	4 weirs built	invertebrate lizard and fish knowledge gaps filled	Management applied to a l knowledge gaps	Translocation into all key habitats	1 side stream with weed management	1 km of weed management	2 species sites managed	All pests and weeds managed																								
Scenario 2	2 islands	0.5 islands	8 km cleared	800 ha cleared	2000 ha trapped	3000 ha with traps setup	1 colony	0 ha	30 ha	2 weirs built	invertebrate lizard and fish knowledge gaps filled	Management applied to a l knowledge gaps	Translocation into all key habitats	1 side stream with weed management	1 km of weed management	2 species sites managed	Some pests and weeds managed																								
Scenario 3	2 islands	0.5 islands	5 km cleared	500 ha cleared	1000 ha trapped	1000 ha with traps setup	1 colony	25 ha	25 ha	1 weir built	invertebrate lizard and fish knowledge gaps filled	Management applied to a few knowledge gaps	Translocation into some key habitats	0 sides streams with weed management	1 km of weed management	2 species sites managed	Few key pests and weeds managed																								

Scenario 1	2 islands	0.5 islands	0 km cleared	800 ha cleared	2000 ha trapped	2000 ha with traps setup	1 colony	40 ha	40 ha	4 weirs built	fish knowledge gaps filled	Management applied to a 1 knowledge gaps	Translocation into all key habitats	with weed management	weed management	sites managed	weeds managed
Scenario 2	2 islands	0.5 islands	8 km cleared	800 ha cleared	2000 ha trapped	2000 ha with traps setup	1 colony	0 ha	30 ha	2 weirs built	invertebrate lizard and fish knowledge gaps filled	Management applied to a 1 knowledge gaps	Translocation into all some key habitats	1 side stream with weed management	1 km of weed management	2 species sites managed	Some pests and weeds managed
Scenario 3	2 islands	0.5 islands	5 km cleared	500 ha cleared	1000 ha trapped	1000 ha with traps setup	1 colony	25 ha	25 ha	1 weir built	invertebrate lizard and fish knowledge gaps filled	Management applied to a few knowledge gaps	Translocation into some key habitats	0 sides treams with weed management	1 km of weed management	2 species sites managed	Few key pests and weeds managed

ZONE 4																
Zone photo name	Takapo catchment, Lake Takapo, Godley, Cass, MacAulay															
Act v ty/A es	Takapo R ve and adjacent	Takapo R ve and adjacent	Takapo R ve and adjacent	Takapo R ve and adjacent	Takapo R ve and adjacent	Takapo R ve and adjacent	Takapo R ve and adjacent	Takapo R ve and adjacent	Lake Takapo ma g n s	Lake Takapo ma g n s	Lake Takapo ma g n s	Lake Takapo ma g n s	Wetlands n Takapo catchment	Cass, Godley, MacAulay R ve s	Takapo Canal	Takapo Canal
Key management act ion	stand c eat on	stand replacemnt	B a d pla n clea ance	ma ntance clea ed a ax	p edato mnt at clea ed a ax	setup p edato mnt at	Black backed p	Off to not ve t	weed management	Wetlands n Takapo catchment	Wetlands n Takapo catchment	Wetlands n Takapo catchment	Wetlands n Takapo catchment	Wetlands n Takapo catchment	Wetlands n Takapo catchment	Wetlands n Takapo catchment
Scena o 1	0 stands	0	45 km clea ed	1100 ha weeds clea ed	1100 ha t apped	1100 ha w th t app setup	2 colonies	30 we s bu lt	10 km weeds clea ed	100 ha of hab tat esto ed	5 spec es s tes managed	All pests and weeds managed	400 ha wetlands	15000 ha unde bu veil ence and esponse	45 km w th weed cont ol	36 km esto ed
Scena o 2	25 stands	3 stands	25 km clea ed	600 ha weeds clea ed	600 ha t apped	600 ha w th t app setup	2 colonies	25 we s bu lt	10 km weeds clea ed	100 ha of hab tat esto ed	5 spec es s tes managed	Some pests and weeds managed	200 ha wetlands	15000 ha unde bu veil ence and esponse	45 km w th weed cont ol	22 km esto ed
Scena o 3	10 stands	1.5 stands	8 km clea ed	190 ha weeds clea ed	190 ha t apped	190 ha w th t app setup	1 colony	15 we s bu lt	10 m weeds clea ed	100 ha of hab tat esto ed	5 spec es s tes managed	Few key pests and weeds managed	100 ha wetlands	15000 ha unde bu veil ence and esponse	45 km w th weed cont ol	14 km esto ed

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Scenario 1

Sum of Average annual cost S1		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki Hakataramea	3 531 757
ZONE 2	Ahuriri catchment and lower Lakes	1 028 457
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	574 357
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 900 379
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	2 962 383
Grand Total		9,997,333

Sum of S1 annual (Direct 15% OH 15%contingency)						
Zone	Zone short name	Total				
ZONE 1	Lower Waitaki Hakataramea	4 591 284	3531757.14	4591284.29	3500000	4550000
ZONE 2	Ahuriri catchment and lower Lakes	1 336 994	1028457.14	1336994.29	1000000	1300000
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	746 664	574357.143	746664.286	550000	700000
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2 470 492	1900378.57	2470492.14	1900000	2450000
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	3 851 098	2962382.86	3851097.71	2950000	3850000
Grand Total		12,996,533	9997332.86	12996532.7	9950000	12950000

Scenario 2

Sum of Average annual cost S2		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki Hakataramea	1 612 040
ZONE 2	Ahuriri catchment and lower Lakes	979 771
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	546 214
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 841 493
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	1 839 469
Grand Total		6,818,987

Sum of S2 annual (Direct 15% OH 15%contingency)						
Zone	Zone short name	Total				
ZONE 1	Lower Waitaki Hakataramea	2 095 652	1612040	2095652	1650000	2100000
ZONE 2	Ahuriri catchment and lower Lakes	1 273 703	979771.429	1273702.86	1000000	1300000
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	710 079	546214.286	710078.571	550000	750000
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2 393 941	1841492.86	2393940.71	1850000	2400000
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	2 391 309	1839468.57	2391309.14	1850000	2400000
Grand Total		8,864,683	6818987.14	8864683.29	6850000	8900000

Scenario 3

Sum of Average annual cost S3		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki Hakataramea	694 851
ZONE 2	Ahuriri catchment and lower Lakes	620 614
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	481 571
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 200 564
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	872 869
Grand Total		3,870,470

Sum of S3 annual (Direct 15% OH 15%contingency)						
Zone	Zone short name	Total				
ZONE 1	Lower Waitaki Hakataramea	903 307	694851.429	903306.857	0 00	950000
ZONE 2	Ahuriri catchment and lower Lakes	806 799	620614.286	806798.571	6500 0	850000
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	626 043	481571.429	626042.857	500000	650000
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 560 734	1200564.29	1560 057	500000	1600000
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	1 134 730	872868.857	1134 251	900000	1150000
Grand Total		5,031,611	3870470.29	5031611.3	3900000	5050000

[illegible]

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From: [Richard Maloney](#)
To: [Ken Hughey](#); [Jo Macpherson](#)
Cc: [Colin O'Donnell](#)
Subject: Management Zones and management activities for Waitaki catchment for Meridian-Genesis discussions
Date: Thursday, 5 May 2022 4:42:05 pm
Attachments: [Management Zones and management activities for Waitaki catchment for Meridian-Genesis discussions.docx](#)

Hi Ken and Jo

Here's the Waitaki zones with their costs, and a summary of key actions, plus a map. Just bringing together all the various emails/docos from last few days.

Cheers

Richard

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Management Zones and management activities for Waitaki catchment for Meridian/Genesis/DOC discussions

This document is background working information to support the development of concepts and plans for future management of biodiversity values in the Waitaki catchment.

Five management zones are used, covering all of the Waitaki catchment. Zones are:

ZONE 1: Lower Waitaki below Waitaki dam, including Hakataramea River

ZONE 2: Ahuriri River catchment including side streams (e.g., Omarama, Henburn, Quailburn streams), Benmore Arm of Lake Benmore, and Lakes Aviemore and Waitaki

ZONE 3a: Hopkins, Dobson and Tasman Rivers including Lake Ohau and Lake Pukaki

ZONE 3b: Pukaki, Upper Ohau, Lower Ohau Rivers, including Lake Ruataniwha and Lake Benmore (Tekapo arm), and side streams (e.g., Twizel, Fraser Streams)

ZONE 4: Tekapo River catchment, Lake Tekapo, Godley, Cass, MacAulay Rivers, including side streams (e.g., Forks, Maryburn, Irishmans, Grays, Sawdon, Edwards streams)

Key focal values, management activities and costs are given for each zone below.

Table 1: Zone names and a summary of the key focus of the work in each zone (note that not all work is indicated in the lists).

ZONE	ZONE NAME	Key focus of work
ZONE 1	Lower Waitaki, Hakataramea	Restoration of braid plains and side streams, wetland enhancement in catchment including fish and tuna habitat, island creation, weed control and targeted predator control, knowledge gaps filled.
ZONE 2	Ahuriri catchment and lower Lakes	Focussed restoration in key exemplar sites on river with associated weed and predator management, some broadscale river weed management, targeted lake edge weed control, site specific threatened species management, knowledge gaps filled, wetland enhancement in catchment including fish and tuna habitat, tuna restoration via translocation
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	Landscape scale predator management in lower river reaches, spot weed control on rivers and adjacent to native values on lakes, site specific threatened species management, knowledge gaps filled, wetland enhancement in catchment including fish and tuna habitat, tuna restoration via translocation
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	Exemplar sites with predator and weed management in lower river reaches focused on threatened species hotspots, low level weed control adjacent to native values on lakes, side stream restoration, and areas of terrestrial braid plain weeds managed, knowledge gaps filled, wetland enhancement in catchment including fish and tuna habitat, tuna restoration via translocation
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	Restoration of braid plains and side streams, wetland enhancement in catchment including fish and tuna habitat, island creation, weed control and targeted predator control, knowledge gaps filled. Restoration of Bays on Lake, and of wetlands in catchment. Tuna restoration via translocation, Island restoration, spot weed control on lake edges, canal carex plantings, no-flow wetland areas established adjoining canal.

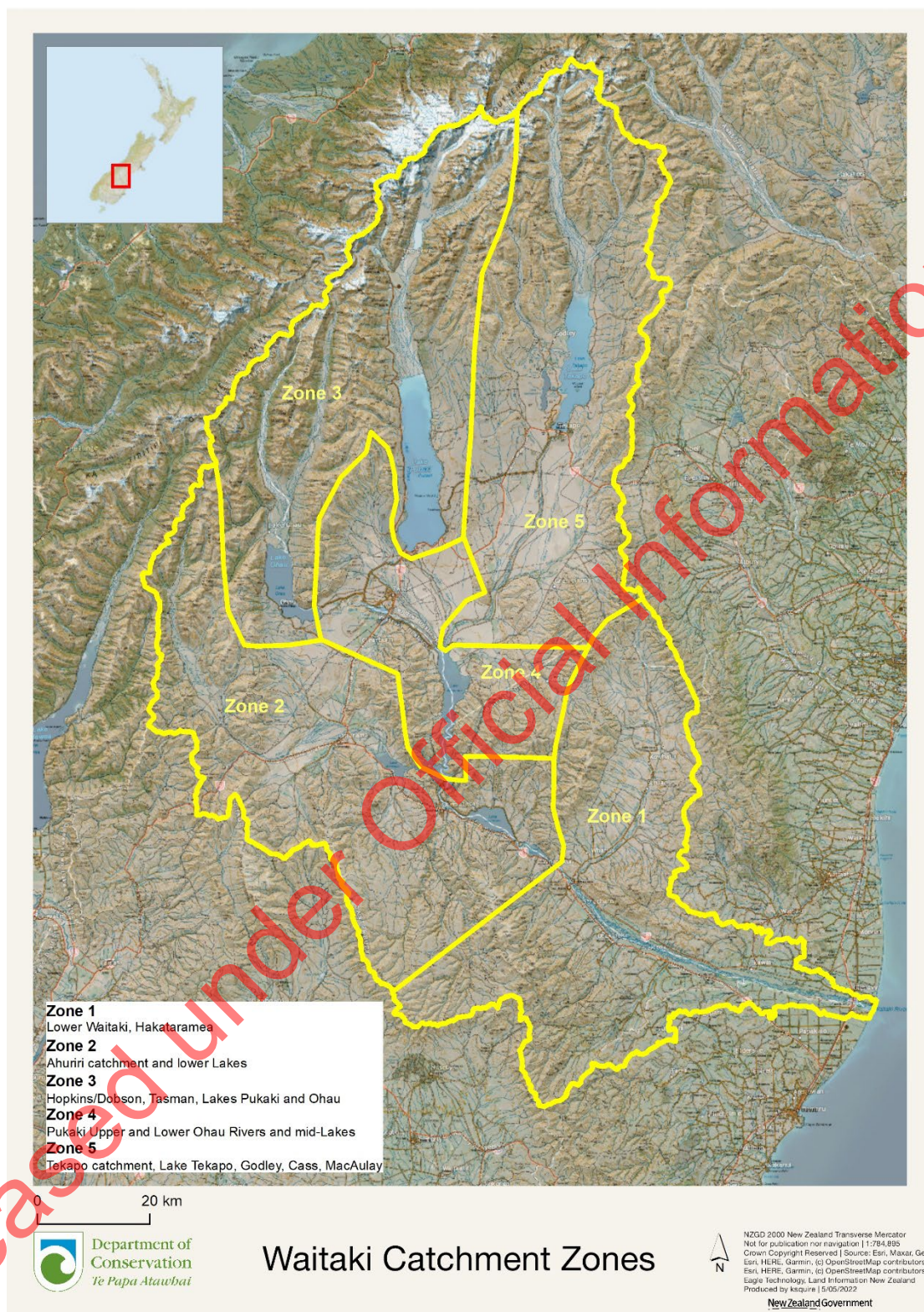


Figure 1: Map of Zones (note that zone 3a and 3b replace Zone 3 and 4 on this map, and zone 5 is now called Zone 4).

Table 2: Average annual **direct costs** for each zone for each of three scenarios. Scenario 1 affords adequate protection and restoration, where nearly all values are thriving. Scenario 2 affords protection and restoration of many values, often in exemplar sites. Scenario 3 affords limited protection and restoration for only some values.

Average annual direct costs Scenario 1

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 3,500,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,900,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,950,000
	TOTAL average annual direct cost	\$ 9,950,000

Average annual direct costs Scenario 2

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 1,650,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,850,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,850,000
	TOTAL average annual direct cost	\$ 6,850,000

Average annual direct costs Scenario 3

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 700,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 650,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 500,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,250,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 900,000
	TOTAL average annual direct cost	\$ 3,900,000

Table 3: Average annual **direct and indirect costs** for each zone for each of three scenarios. Scenario 1 affords adequate protection and restoration, where nearly all values are thriving. Scenario 2 affords protection and restoration of many values, often in exemplar sites. Scenario 3 affords limited protection and restoration for only some values.

Scenario 1 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	\$ 4,550,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 700,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,450,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 3,850,000
	TOTAL average annual direct + indirect cost	\$ 12,950,000

Scenario 2 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 2,100,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 750,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,400,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,400,000
	TOTAL average annual direct + indirect cost	\$ 8,900,000

Scenario 3 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 950,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 850,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 650,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,600,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,150,000
	TOTAL average annual direct + indirect cost	\$ 5,050,000

From: [Richard Maloney](#)
To: [Ken Hughey](#)
Subject: Ver_2 Scenarios for levels of value management Tekapo system_SUMMARY.xlsx
Date: Thursday, 5 May 2022 12:45:48 pm
Attachments: [Ver_2 Scenarios for levels of value management Tekapo system_SUMMARY.xlsx](#)

Costs less than \$10mill for Scenario 1.

New ZONE names added

Some changes to other costs across scenarios to balance this. Most reductions in amount of predator and weed control in 3B, and some reductions in ZONE 1 and 4.

Will send a short narrative soon, and will give you this with latest copy of spreadsheet, plus Map draft this arvo.

Cheers

Richard

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Average annual direct costs Scenario 1

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 3,600,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,050,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 600,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,450,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 3,050,000
TOTAL average annual direct cost		\$ 10,700,000

Average annual direct costs Scenario 2

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 1,650,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,300,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,900,000
TOTAL average annual direct cost		\$ 7,350,000

Average annual direct costs Scenario 3

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 750,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 650,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 500,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,150,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 900,000
TOTAL average annual direct cost		\$ 4,900,000

Scenario 1 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	\$ 4,700,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,400,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 750,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 3,200,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 4,000,000
TOTAL average annual direct + indirect cost		\$ 13,900,000

Scenario 2 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 2,150,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 750,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 3,000,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,450,000
TOTAL average annual direct + indirect cost		\$ 9,550,000

Scenario 3 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 950,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 850,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 650,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,800,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,200,000
TOTAL average annual direct + indirect cost		\$ 6,350,000

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Scenario 1

Sum of Average annual cost S1		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	3,587,814
ZONE 2	Ahuriri catchment and lower Lakes	1,041,314
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	574,357
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,430,586
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	3,043,097
Grand Total		10,677,169

Scenario 2

Sum of Average annual cost S2		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	1,646,326
ZONE 2	Ahuriri catchment and lower Lakes	992,629
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	546,214
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,290,243
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	1,065,183
Grand Total		7,340,593

Scenario 3

Sum of Average annual cost S3		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	716,280
ZONE 2	Ahuriri catchment and lower Lakes	633,471
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	481,571
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,146,114
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	898,583
Grand Total		4,876,020

Sum of S1 annual (Direct+15% OH+15%contingency)		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	4,664,159
ZONE 2	Ahuriri catchment and lower Lakes	1,353,709
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	746,664
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	3,159,761
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	3,956,026
Grand Total		13,880,319

Sum of S2 annual (Direct+15% OH+15%contingency)		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	2,140,223
ZONE 2	Ahuriri catchment and lower Lakes	1,290,417
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	710,009
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,977,311
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	2,424,738
Grand Total		9,542,773

Sum of S3 annual (Direct+15% OH+15%contingency)		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	931,164
ZONE 2	Ahuriri catchment and lower Lakes	823,513
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	626,043
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,789,949
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	1,168,158
Grand Total		6,338,826

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2. 200 pages (200 words)	\$200	\$200	\$200	\$200
3. 300 pages (300 words)	\$300	\$300	\$300	\$300
4. 400 pages (400 words)	\$400	\$400	\$400	\$400
5. 500 pages (500 words)	\$500	\$500	\$500	\$500
6. 600 pages (600 words)	\$600	\$600	\$600	\$600
7. 700 pages (700 words)	\$700	\$700	\$700	\$700
8. 800 pages (800 words)	\$800	\$800	\$800	\$800
9. 900 pages (900 words)	\$900	\$900	\$900	\$900
10. 1000 pages (1000 words)	\$1000	\$1000	\$1000	\$1000
11. 1100 pages (1100 words)	\$1100	\$1100	\$1100	\$1100
12. 1200 pages (1200 words)	\$1200	\$1200	\$1200	\$1200
13. 1300 pages (1300 words)	\$1300	\$1300	\$1300	\$1300
14. 1400 pages (1400 words)	\$1400	\$1400	\$1400	\$1400
15. 1500 pages (1500 words)	\$1500	\$1500	\$1500	\$1500
16. 1600 pages (1600 words)	\$1600	\$1600	\$1600	\$1600
17. 1700 pages (1700 words)	\$1700	\$1700	\$1700	\$1700
18. 1800 pages (1800 words)	\$1800	\$1800	\$1800	\$1800
19. 1900 pages (1900 words)	\$1900	\$1900	\$1900	\$1900
20. 2000 pages (2000 words)	\$2000	\$2000	\$2000	\$2000
21. 2100 pages (2100 words)	\$2100	\$2100	\$2100	\$2100
22. 2200 pages (2200 words)	\$2200	\$2200	\$2200	\$2200
23. 2300 pages (2300 words)	\$2300	\$2300	\$2300	\$2300
24. 2400 pages (2400 words)	\$2400	\$2400	\$2400	\$2400
25. 2500 pages (2500 words)	\$2500	\$2500	\$2500	\$2500
26. 2600 pages (2600 words)	\$2600	\$2600	\$2600	\$2600
27. 2700 pages (2700 words)	\$2700	\$2700	\$2700	\$2700
28. 2800 pages (2800 words)	\$2800	\$2800	\$2800	\$2800
29. 2900 pages (2900 words)	\$2900	\$2900	\$2900	\$2900
30. 3000 pages (3000 words)	\$3000	\$3000	\$3000	\$3000
31. 3100 pages (3100 words)	\$3100	\$3100	\$3100	\$3100
32. 3200 pages (3200 words)	\$3200	\$3200	\$3200	\$3200
33. 3300 pages (3300 words)	\$3300	\$3300	\$3300	\$3300
34. 3400 pages (3400 words)	\$3400	\$3400	\$3400	\$3400
35. 3500 pages (3500 words)	\$3500	\$3500	\$3500	\$3500
36. 3600 pages (3600 words)	\$3600	\$3600	\$3600	\$3600
37. 3700 pages (3700 words)	\$3700	\$3700	\$3700	\$3700
38. 3800 pages (3800 words)	\$3800	\$3800	\$3800	\$3800
39. 3900 pages (3900 words)	\$3900	\$3900	\$3900	\$3900
40. 4000 pages (4000 words)	\$4000	\$4000	\$4000	\$4000
41. 4100 pages (4100 words)	\$4100	\$4100	\$4100	\$4100
42. 4200 pages (4200 words)	\$4200	\$4200	\$4200	\$4200
43. 4300 pages (4300 words)	\$4300	\$4300	\$4300	\$4300
44. 4400 pages (4400 words)	\$4400	\$4400	\$4400	\$4400
45. 4500 pages (4500 words)	\$4500	\$4500	\$4500	\$4500
46. 4600 pages (4600 words)	\$4600	\$4600	\$4600	\$4600
47. 4700 pages (4700 words)	\$4700	\$4700	\$4700	\$4700
48. 4800 pages (4800 words)	\$4800	\$4800	\$4800	\$4800
49. 4900 pages (4900 words)	\$4900	\$4900	\$4900	\$4900
50. 5000 pages (5000 words)	\$5000	\$5000	\$5000	\$5000
51. 5100 pages (5100 words)	\$5100	\$5100	\$5100	\$5100
52. 5200 pages (5200 words)	\$5200	\$5200	\$5200	\$5200
53. 5300 pages (5300 words)	\$5300	\$5300	\$5300	\$5300
54. 5400 pages (5400 words)	\$5400	\$5400	\$5400	\$5400
55. 5500 pages (5500 words)	\$5500	\$5500	\$5500	\$5500
56. 5600 pages (5600 words)	\$5600	\$5600	\$5600	\$5600
57. 5700 pages (5700 words)	\$5700	\$5700	\$5700	\$5700
58. 5800 pages (5800 words)	\$5800	\$5800	\$5800	\$5800
59. 5900 pages (5900 words)	\$5900	\$5900	\$5900	\$5900
60. 6000 pages (6000 words)	\$6000	\$6000	\$6000	\$6000
61. 6100 pages (6100 words)	\$6100	\$6100	\$6100	\$6100
62. 6200 pages (6200 words)	\$6200	\$6200	\$6200	\$6200
63. 6300 pages (6300 words)	\$6300	\$6300	\$6300	\$6300
64. 6400 pages (6400 words)	\$6400	\$6400	\$6400	\$6400
65. 6500 pages (6500 words)	\$6500	\$6500	\$6500	\$6500
66. 6600 pages (6600 words)	\$6600	\$6600	\$6600	\$6600
67. 6700 pages (6700 words)	\$6700	\$6700	\$6700	\$6700
68. 6800 pages (6800 words)	\$6800	\$6800	\$6800	\$6800
69. 6900 pages (6900 words)	\$6900	\$6900	\$6900	\$6900
70. 7000 pages (7000 words)	\$7000	\$7000	\$7000	\$7000
71. 7100 pages (7100 words)	\$7100	\$7100	\$7100	\$7100
72. 7200 pages (7200 words)	\$7200	\$7200	\$7200	\$7200
73. 7300 pages (7300 words)	\$7300	\$7300	\$7300	\$7300
74. 7400 pages (7400 words)	\$7400	\$7400	\$7400	\$7400
75. 7500 pages (7500 words)	\$7500	\$7500	\$7500	\$7500
76. 7600 pages (7600 words)	\$7600	\$7600	\$7600	\$7600
77. 7700 pages (7700 words)	\$7700	\$7700	\$7700	\$7700
78. 7800 pages (7800 words)	\$7800	\$7800	\$7800	\$7800
79. 7900 pages (7900 words)	\$7900	\$7900	\$7900	\$7900
80. 8000 pages (8000 words)	\$8000	\$8000	\$8000	\$8000
81. 8100 pages (8100 words)	\$8100	\$8100	\$8100	\$8100
82. 8200 pages (8200 words)	\$8200	\$8200	\$8200	\$8200
83. 8300 pages (8300 words)	\$8300	\$8300	\$8300	\$8300
84. 8400 pages (8400 words)	\$8400	\$8400	\$8400	\$8400
85. 8500 pages (8500 words)	\$8500	\$8500	\$8500	\$8500
86. 8600 pages (8600 words)	\$8600	\$8600	\$8600	\$8600
87. 8700 pages (8700 words)	\$8700	\$8700	\$8700	\$8700
88. 8800 pages (8800 words)	\$8800	\$8800	\$8800	\$8800
89. 8900 pages (8900 words)	\$8900	\$8900	\$8900	\$8900
90. 9000 pages (9000 words)	\$9000	\$9000	\$9000	\$9000
91. 9100 pages (9100 words)	\$9100	\$9100	\$9100	\$9100
92. 9200 pages (9200 words)	\$9200	\$9200	\$9200	\$9200
93. 9300 pages (9300 words)	\$9300	\$9300	\$9300	\$9300
94. 9400 pages (9400 words)	\$9400	\$9400	\$9400	\$9400
95. 9500 pages (9500 words)	\$9500	\$9500	\$9500	\$9500
96. 9600 pages (9600 words)	\$9600	\$9600	\$9600	\$9600
97. 9700 pages (9700 words)	\$9700	\$9700	\$9700	\$9700
98. 9800 pages (9800 words)	\$9800	\$9800	\$9800	\$9800
99. 9900 pages (9900 words)	\$9900	\$9900	\$9900	\$9900
100. 10000 pages (10000 words)	\$10000	\$10000	\$10000	\$10000

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Average annual direct costs Scenario 1

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 3,500,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,900,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,950,000
	TOTAL average annual direct cost	\$ 9,950,000

Average annual direct costs Scenario 2

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 1,650,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,850,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,850,000
	TOTAL average annual direct cost	\$ 6,850,000

Average annual direct costs Scenario 3

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 700,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 650,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 500,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,250,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 900,000
	TOTAL average annual direct cost	\$ 3,900,000

Scenario 1 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	\$ 4,550,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 700,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,450,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 3,850,000
	TOTAL average annual direct + indirect cost	\$ 12,950,000

Scenario 2 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 2,100,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 750,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,400,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,400,000
	TOTAL average annual direct + indirect cost	\$ 8,900,000

Scenario 3 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 950,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 850,000
ZONE 3A	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 650,000
ZONE 3B	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 1,600,000
ZONE 4	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,150,000
	TOTAL average annual direct + indirect cost	\$ 5,050,000

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Scenario 1

Sum of Average annual cost S1		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki Hakataramea	3 531 757
ZONE 2	Ahuriri catchment and lower Lakes	1 028 457
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	574 357
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 900 379
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	2 962 383
Grand Total		9,997,333

Sum of S1 annual (Direct 15% OH 15%contingency)						
Zone	Zone short name	Total				
ZONE 1	Lower Waitaki Hakataramea	4 591 284	3531757.14	4591284.29	3500000	4550000
ZONE 2	Ahuriri catchment and lower Lakes	1 336 994	1028457.14	1336994.29	1000000	1300000
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	746 664	574357.143	746664.286	550000	700000
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2 470 492	1900378.57	2470492.14	1900000	2450000
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	3 851 098	2962382.86	3851097.71	2950000	3850000
Grand Total		12,996,533	9997332.86	12996532.7	9950000	12950000

Scenario 2

Sum of Average annual cost S2		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki Hakataramea	1 612 040
ZONE 2	Ahuriri catchment and lower Lakes	979 771
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	546 214
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 841 493
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	1 839 469
Grand Total		6,818,987

Sum of S2 annual (Direct 15% OH 15%contingency)						
Zone	Zone short name	Total				
ZONE 1	Lower Waitaki Hakataramea	2 095 652	1612040	2095652	1650000	2100000
ZONE 2	Ahuriri catchment and lower Lakes	1 273 703	979771.429	1273702.86	1000000	1300000
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	710 079	546214.286	710078.571	550000	750000
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2 393 941	1841492.86	2393940.71	1850000	2400000
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	2 391 309	1839468.57	2391309.14	1850000	2400000
Grand Total		8,864,683	6818987.14	8864683.29	6850000	8900000

Scenario 3

Sum of Average annual cost S3		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki Hakataramea	694 851
ZONE 2	Ahuriri catchment and lower Lakes	620 614
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	481 571
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 200 564
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	872 869
Grand Total		3,870,470

Sum of S3 annual (Direct 15% OH 15%contingency)						
Zone	Zone short name	Total				
ZONE 1	Lower Waitaki Hakataramea	903 307	694851.429	903306.857	0 00	950000
ZONE 2	Ahuriri catchment and lower Lakes	806 799	620614.286	806798.571	6500 0	850000
ZONE 3A	Hopkins/Dobson Tasman Lakes Pukaki and Ohau	626 043	481571.429	626042.857	500000	650000
ZONE 3B	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	1 560 734	1200564.29	1560 057	500000	1600000
ZONE 4	Tekapo catchment Lake Tekapo Godley Cass MacAulay	1 134 730	872868.857	1134 251	900000	1150000
Grand Total		5,031,611	3870470.29	5031611.3	3900000	5050000

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From: [Richard Maloney](#)
To: [Colin O'Donnell](#)
Cc: [Ken Hughey](#)
Subject: FW: Ver_2 Scenarios for levels of value management Tekapo system_SUMMARY.xlsx
Date: Thursday, 5 May 2022 7:29:05 am
Attachments: [Ver_2 Scenarios for levels of value management Tekapo system_SUMMARY.xlsx](#)

Hi Colin

I'd appreciate you having a quick scan of this doco. The red tab is all costs for all 5 "zones" in the catchment. Zone 5 is Genesis, rest is Meridian.

Ken and I have been working through the actions to include and not, this is in the blue tabs...

He is going to use this tomorrow in next discussion ...

Any thoughts, anything stands out as being well out of line (actions or costs)??

Thanks

Richard

From: Richard Maloney
Sent: Wednesday, 4 May 2022 9:18 pm
To: Ken Hughey <khughey@doc.govt.nz>
Subject: Ver_2 Scenarios for levels of value management Tekapo system_SUMMARY.xlsx

Hi Ken

Here's a summary sheet with some cost estimates. The costs follow from our discussion. I will tidy up a word doco or table showing the cost scenario details.

The red tab is the one to look at.

Key points:

1. First column of tables is direct costs
2. Second column of tables is Direct +30%
3. I've rounded costs to nearest \$50k
4. While the calculations I've used may be a bit rushed, the overall level feels pretty good.
5. There is a good balance between zone 5 (genesis) and the sum of the zone 1-4 – ie Meridian bear the greater proportion of costs
6. The sites where the are directly impacting (Zone 1, 4, 5) have higher costs than zone 2,3 (Ahuriri and Hopkins/Tasman areas).
7. The overall amounts look okay to achieve something real.

Your thoughts welcome. I am at a student presentation session at Otago 9-11. Will give you a text summary info around lunchtime or early arvo. Map is due about midday tomorrow fro GIS team.

Cheers

Richard

Average annual direct costs Scenario 1

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 3,600,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,050,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 600,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,450,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 3,050,000
TOTAL average annual direct cost		\$ 10,700,000

Average annual direct costs Scenario 2

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 1,650,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,000,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 550,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,300,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,900,000
TOTAL average annual direct cost		\$ 7,350,000

Average annual direct costs Scenario 3

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 750,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 650,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 500,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,150,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 900,000
TOTAL average annual direct cost		\$ 4,900,000

Scenario 1 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	\$ 4,700,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,400,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 750,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 3,200,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 4,000,000
TOTAL average annual direct + indirect cost		\$ 13,900,000

Scenario 2 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 2,150,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 1,300,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 750,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 3,000,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 2,450,000
TOTAL average annual direct + indirect cost		\$ 9,550,000

Scenario 3 average annual costs (Direct+15%OH+15%contingency)

Zone	Zone short name	
ZONE 1	Lower Waitaki, Hakataramea	\$ 950,000
ZONE 2	Ahuriri catchment and lower Lakes	\$ 850,000
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	\$ 650,000
ZONE 4	Pukaki, Upper and Lower Ohau Rivers and mid-Lakes	\$ 2,800,000
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	\$ 1,200,000
TOTAL average annual direct + indirect cost		\$ 6,350,000

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Scenario 1

Sum of Average annual cost S1		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	3,587,814
ZONE 2	Ahuriri catchment and lower Lakes	1,041,314
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	574,357
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,430,586
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	3,043,097
Grand Total		10,677,169

Scenario 2

Sum of Average annual cost S2		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	1,646,326
ZONE 2	Ahuriri catchment and lower Lakes	992,629
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	546,214
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,290,243
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	1,065,183
Grand Total		7,340,593

Scenario 3

Sum of Average annual cost S3		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	716,280
ZONE 2	Ahuriri catchment and lower Lakes	633,471
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	481,571
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,146,114
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	898,583
Grand Total		4,876,020

Sum of S1 annual (Direct+15% OH+15%contingency)		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	4,664,159
ZONE 2	Ahuriri catchment and lower Lakes	1,353,709
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	746,664
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	3,159,761
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	3,956,026
Grand Total		13,880,319

Sum of S2 annual (Direct+15% OH+15%contingency)		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	2,140,223
ZONE 2	Ahuriri catchment and lower Lakes	1,290,417
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	710,009
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,977,311
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	2,424,738
Grand Total		9,542,773

Sum of S3 annual (Direct+15% OH+15%contingency)		
Zone	Zone short name	Total
ZONE 1	Lower Waitaki, Hakataramea	931,164
ZONE 2	Ahuriri catchment and lower Lakes	823,513
ZONE 3	Hopkins/Dobson, Tasman, Lakes Pukaki and Ohau	626,043
ZONE 4	Pukaki Upper and Lower Ohau Rivers and mid-Lakes	2,789,949
ZONE 5	Tekapo catchment, Lake Tekapo, Godley, Cass, MacAulay	1,168,158
Grand Total		6,338,826

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From: [Richard Maloney](#)
To: [Ken Hughey](#)
Subject: Ver_2 Scenarios for levels of value management Tekapo system_SUMMARY.xlsx
Date: Wednesday, 4 May 2022 9:18:32 pm
Attachments: [Ver_2 Scenarios for levels of value management Tekapo system_SUMMARY.xlsx](#)

Hi Ken

Here's a summary sheet with some cost estimates. The costs follow from our discussion. I will tidy up a word doco or table showing the cost scenario details.

The red tab is the one to look at.

Key points:

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2. Second column of tables is Direct +30%.
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6. The sites where they are directly impacting (Zone 1, 4, 5) have higher costs than zone 2,3 (Ahuriri and Hopkins/Tasman areas).
7. The overall amounts look okay to achieve something real.

Your thoughts welcome. I am at a student presentation session at Otago 9-11. Will give you a text summary info around lunchtime or early arvo. Map is due about midday tomorrow fro GIS team.

Cheers

Richard

From: [Jo Macpherson](#)
To: [Henry Weston](#)
Cc: [Ken Hughey](#)
Subject: FW: Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 (002) (002)
Date: Friday, 22 April 2022 9:56:16 am
Attachments: [Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 \(002\) \(002\).docx](#)

Henry

As discussed, here is the high level document we referred to. Note the wording of the addition to the 'Working in Partnership' section has come from Meridian.

Ken, I will need to try and tidy this up and send back to the Generators today really.

Thanks Jo

From: Ken Hughey <khughey@doc.govt.nz>

Sent: 21 April 2022 12:48

To: Jo Macpherson <jmacpherson@doc.govt.nz>

Subject: Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 (002) (002)

Jo

I've added a little to the Middle section of the Waitaki about catch and carry. Nothing else needed there.

I am happy with the wording of 1 to 6 as the flood flows bit is covered in 1.

OK?

Any progress with Henry

Thanks Ken

From: [Jo Macpherson](#)
To: [Ken Hughey](#)
Subject: Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 (002)
Date: Thursday, 21 April 2022 9:41:40 am
Attachments: [Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 \(002\).docx](#)

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Reconsenting Waitaki Power Scheme pre-consultation

Initial DOC picture of a biodiversity rich Waitaki

22 March 2022

INTENT:

The parties (the Department of Conservation, Meridian Energy and Genesis Energy) will work towards an agreement over the next two months that will achieve ecologically [and culturally] enduring biodiversity conservation outcomes. This is in response to the ongoing ecological effects of the operation of the Waitaki Power Scheme and Tekapo Power Scheme that will exceed any likely outcome from the resource consenting process (including the Environment Court).

The parties:

- acknowledge the national importance of the renewable electricity generation from the Waitaki and Tekapo Schemes, including their critical role in decarbonising the New Zealand economy in response to climate change.
- acknowledge that the construction and ongoing operation of the first hydro-electric dam (operating from 1934) and subsequent developments have led to significant alteration to ecosystem processes and to overall environmental change¹, including for indigenous biodiversity.
- note the importance for nature conservation of the continuity of natural processes, within the limits associated with the production of renewable energy from freshwater in the Waitaki catchment. This understanding sits within the context of the National Policy Statement for Renewable Electricity Generation, National Policy Statement for Freshwater Management, regional water allocation which sits within the framework of the Waitaki Catchment Water Allocation Regional Plan, and regional water quality management which sits in the Canterbury Land and Water Regional Plan
- acknowledge that a lot has been learned over the last three decades, through Project River Recovery (PRR) and other means. These lessons will enable us to work at larger scales and greater pace into the future, with confidence around expected conservation benefits. By using an adaptive learning and management approach over time, we will further improve these opportunities.
- acknowledge Ki uta Ki Tai & Te Mana o Te Wai
- acknowledge that achieving the biodiversity conservation outcomes requires work at a catchment scale working in partnership with Ngāi Tahu, and having regard in other work with to landowners, communities, and stakeholders within the catchment; for some of this work there will be a need to be strongly collaborative and to take a coordinated approach.
- Acknowledge Te Mana o Te Taio and its implementation plan, which contains government obligations consistent with the intent of this agreement. (footnote Ken)
<https://www.doc.govt.nz/globalassets/documents/conservation/biodiversity/anzbs-implementation-plan-2022.pdf>

PRINCIPLES:

The *Terms of Reference in relation to re-consenting with Waitaki power scheme* (TOR) was signed in October 2021 between Meridian and DoC and set out a list of agreed principles (refer to Appendix 1). These were discussed on 15th March 2022 and largely accepted, with some minor additions. The revised set of principles are listed below:

- **Good faith**
Agreements are to be reached in good faith, supported by open, honest and respectful dialogue.
- **Outcome**
Agreement and activity should prioritise real biodiversity conservation outcomes in response to the operation of the Waitaki Power Scheme and Tekapo Power Scheme.
- **Enduring**
Agreements must be sufficiently robust to endure in the long term but sufficiently agile to move forward.

¹ This change has included detrimental impact to some key values but gains for some other values.

- **Fairness**
Agreements should be perceived to be even-handed and fair.
- **Integration**
Agreements are to be reached with an understanding of the inter-relationships between the parties and with other processes and parties.
- **Treaty Partner**
The parties acknowledge the roles that DOC as part of the Crown and Ngāi Tahu have as Treaty Partners under Section 4 of the Conservation Act.
- **Realism**
Agreements will focus on ecological [and cultural] practical results on the ground while recognising NZ's climate change commitments and the need for renewable energy.
- **Scope**
Agreements will focus on existing hydro activities and replacement consents rather than expansion.

OUTCOME STATEMENT:

The parties discussed² and built on the three aims of DOC's Ngā Awa programme and agreed on the following outcome statement:

The parties will work together towards improving the condition, biodiversity, ecological processes and other values of the braided rivers and associated environment including the wetlands within the Waitaki catchment.

This outcome will be achieved via specific objectives through collaboration and co-design with our project partners. Biodiversity conservation planning, including prioritisation, will be underpinned by sound technical and scientific advice. The importance of taonga species will be recognised, along with the relationship between conservation and other land uses and the intersection between the two.

THE DEPARTMENT'S APPROACH:

We will describe an aspirational but achievable picture of what the Waitaki Catchment, where linked to braided rivers and their environs, could look like in the long term. This picture is broken down into two sub-contexts: the upper and lower catchments. The upper catchment has two parts reflecting the influence of the two power schemes: an 'impacted' braided river and environs perspective, and a 'non-impacted' braided river and environs natural state perspective.

We will then specifically define the value set we are seeking to improve, focusing on ecological [and cultural] values, including the protection, enhancement and restoration of ecological function, habitat protection, and management and potential use of sensitive species populations. We will enter into detailed negotiations around staging and the range of work needed to achieve outcomes across the following:

- Lake margins and deltas
- Wetland areas and springs associated with lakes and braided rivers
- Braided rivers (both aquatic, within the braid plain) and their margins
- Areas of connection between these elements

OPPORTUNITIES AND LIMITATIONS:

There are values we will seek to provide for that are known to contribute to an overall positive, ecological [and cultural] enduring conservation gain. For example, thriving populations of taonga and/or iconic species, or management of threatened or at-risk species to ensure no further loss induced by the schemes (until they can thrive within their ecosystems).

We also recognise that there are areas where the impacts of the schemes, or the effectiveness of management actions are still not fully understood. For example, impacts on invertebrates or how to cost effectively manage fish passage for multiple species past the main hydro lakes. We recognise there will be opportunities to jointly address these knowledge gaps, and to adapt our management approach to incorporate new understanding.

² At negotiation meeting No 2 held on 15 March 2022.

And we acknowledge there are things we cannot restore, e.g., the natural movement of water through the Catchment where that water is required for hydro-electricity generation.

Finally, we recognise that there are drivers of negative biodiversity outcomes that are both influenced by and are wider than the ongoing effects resulting from the operation of the scheme. Systematically untangling these different drivers is fraught. Our approach is pragmatic, being to focus on the biodiversity [and cultural] values influenced by the scheme, taking an adaptive ecological and evidence-based approach to the management of those values.

WORKING IN PARTNERSHIP

Across the catchment we will work in partnership with manawhenua with the intent of delivering significant and enduring biodiversity, conservation and cultural outcomes in response to the operation of the Waitaki Power Scheme and Tekapo Power Scheme. We will explore opportunities for co-governance and related arrangements.

Working in partnership means committing to governance arrangements for this biodiversity programme that is acceptable to Arowhenua, Waihao and Moeraki Rūnaka. These arrangements will need to be determined with Rūnaka. It is likely to result in a form of governance with decision-making over the strategic direction and delivery of the programme that sits outside of the normal Departmental structures.

WORKING WITH OTHERS

Across the catchment we will have regard to others in the delivery of ecological [and cultural] enduring biodiversity conservation outcomes in response to the operation of the Waitaki Power Scheme and Tekapo Power Scheme and multiply the benefits gained from each other's activities across the catchment. This includes collaborating and coordinating where appropriate with:

- Landowners and local communities
- Canterbury Aoraki Conservation Board
- Agencies involved in planning or undertaking conservation activities or activities that have conservation benefit. These include Environment Canterbury, Land Information New Zealand, New Zealand Defence Force, Te Manahuna Aoraki, Fish and Game and Water Zone Committees.

NATURE CONSERVATION VISION FOR THE WAITAKI CATCHMENT

The Waitaki catchment from a water-related conservation perspective – the big picture

The Waitaki catchment can be managed in an integrated way to deliver nature conservation value across the system. What follows is a description of that opportunity for the Lower Waitaki (below Lake Waitaki), the Upper Waitaki (in two sections: the basin rivers, Ōhau, Pukaki and Tekapo which are heavily impacted by the lake operating regimes; and lake and riverine environs above these basin rivers). We recognise there are connectivity questions, especially for fish, between these lower and upper sections.

Lower catchment opportunities

In the lower Waitaki we are working at scale to deliver a partially functioning ecosystem. Large islands and sections of the braid plain have been cleared of weeds, subject to effective predator control, and are supporting significant populations of key native bird species. Side streams, springs and wetlands are restored supporting native fish and birdlife; and the hapua is being managed to restore wetland vegetation and associated values. Key knowledge gaps such as for lizards, freshwater fish and terrestrial invertebrates have been identified and key gaps addressed, for example creation of weirs for freshwater fish in tributaries such as the Hakataramea. All this is achieved in a way that improves taonga species and mahika kai outcomes. Overall, the key components of the system are thriving through active management.

It is possible to achieve a partially functioning ecosystem, as envisaged above, on the Lower Waitaki while acknowledging and accepting the constraints imposed by the existing energy production system.

In the short term, this work will involve weed clearance and wetland enhancement, as well as predator control in some places. We see this work occurring at a large scale, but it will be highly cost effective. We believe that with the tools we currently have available, significant results can be achieved within a decade. As we proceed, we will learn more and be able to deliver more, cost effectively.

Some of this work will also have benefits to other parties; for example, braid plain weed clearance will benefit flood control for adjacent landowners and [REDACTED] River Engineering.

We acknowledge there are some values that we do not currently have the knowledge to restore.

Connectivity between upper and lower catchments

Middle section - connectivity between the Lower Waitaki and the Upper Catchment will continue to be provided past the mainstream hydro-electricity dams for longfin eel (tuna), being diadromus native fish species present in the Upper Catchment that relies on connectivity to complete their life stages. There will also be lake margin work eg: Willow control at Deep Creek.

Upper catchment opportunities

In the Upper Catchment above Lake Benmore, we envisage managed functioning braided rivers and environs ecosystems around and above the existing storage lakes with very high nature conservation values. Below the storage lakes (Tekapo, Pukaki, Ōhau) we envisage protected and partially managed ecosystems, with a focus on protecting what remains.

We envisage thriving biodiversity in the upper catchment, especially around and above the storage lakes; management interventions in the non-impacted rivers are delivering biodiversity returns at a highly meaningful scale. We are working large scale, staging and learning as we go through the use of a science based adaptive management programme.

We are intervening in the impacted Tekapo, Ōhau and Pukaki rivers and environs to protect key species (including native fish and terrestrial invertebrates), while recognising the limits of this work due to operation of the scheme.

The restoration of thriving biodiversity values described above will improve the health of taonga species populations, as well as increasing the populations and types of mahika kai species and the opportunities for mahika kai practices.

Prioritising and staging

Our approach will be to prioritise and appropriately stage the delivery of the nature conservation outcomes vision for all parts of the catchment described above.

Prioritisation will ensure the available resources are focussed on securing the greatest nature conservation gains, which will include collaboration and coordination with others and internal Departmental work.

The following outlines the staged approach for the upper catchment:

Stage 1 will have six elements:

1. In the Tekapo, Ōhau and Pukaki river reaches, which have reduced inflows, we will initially secure populations of species that are vulnerable to extinction. We will achieve this by appropriate habitat management, including predator and weed management, weir construction, management of disturbance, and reduction in abiotic pressures. We will work in a co-ordinated way to take advantage of spill-over (flood and planned) flows – this will include mechanical bed disturbance to improve habitat for birds, and terrestrial invertebrates.
2. In the lower reaches of the Tekapo, Ōhau and Ahuriri, and in wetlands, we will initially improve habitat quality across the braid plain, while at the same time seek to secure substantive remaining wetlands. This habitat management work will start with a focus on woody and tall herbaceous weeds.
3. We will continue to protect and enhance the existing high-quality values in the upper catchments. We will undertake targeted weed and predator management in the Tasman, Godley, Cass, MacAulay, Hopkins, Dobson, and Ahuriri rivers, and in the smaller foothills fed streams such as the Twizel, Edward, Grays, Irishman, Fork, Fraser, Omarama, Otamatapaio and Henburn.
4. For some existing values we have limited understanding of their ecology, distribution, and health. Without attention, these values will likely be lost, particularly where key pressures are high. Before we can decide what actions are required, we need to fill knowledge gaps. We will start this work on terrestrial invertebrate diversity, population status and distribution, and on lizard and freshwater fish population status, in selected habitats across the catchment.
5. For species and habitat values for which we do not have appropriate or affordable tools to manage key pressures, we will take an adaptive management approach to develop and hone methods before their wider application. This will include an initial focus restoration activities to better protect and enhance values.
6. For some habitat types, e.g., wetlands, seepages and side streams, habitat has been substantively lost in the catchment. We will seek out opportunities within the wider catchment area that secure and enhance these habitats. In those sites we will gain long-term legal protection of values and manage pressures that erode those values.

Stage 2 and beyond will be built on the activities and knowledge gained in Stage 1. That will enable a focus on prioritising real biodiversity conservation outcomes and the enhancement of values in accordance with the nature conservation vision above.

From: [Jo Macpherson](#)
To: [Ken Hughey](#)
Subject: FW: Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 (002)
Date: Thursday, 21 April 2022 8:50:33 am
Attachments: [Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 \(002\).docx](#)

Hi Ken, as we have been working outside the DOCCM system, I am now trying to find the last version of the high level document. I think?? This looks like the last one I sent to the Generators so think this should be the right version, can you perhaps check too?

Thanks JO

out of scope

[Redacted content]

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From: [Nicki Atkinson](#)
To: [Richard Maloney](#)
Cc: [Ken Hughey](#); [Jo Macpherson](#)
Subject: RE: Update on today's negotiation mtg with the generators
Date: Tuesday, 12 April 2022 8:42:02 am

Mōrena Richard

Just spoke to Duncan re costs on lower Waitaki:

- \$40-70k per year for black fronted terns depending on how much flood damage there is to the artificial islands and includes ariel control of black backed gulls, weeding etc. Some of this comes from [REDACTED] and/or [REDACTED] for weeds and Meridian has contributed ~\$16k over 5 years to help with flood damage to islands
- Nga Awa work from his team, this year spent \$50k on baseline data gathering. They haven't really planned next year as the Nga Awa work there is still in relationship development phase and only really getting going. By way of comparison, his budget on the Rangitata for core management (weeding mostly) is \$200k per year plus another \$250k per year for work under the Nga Awa programme. Duncan suggested they could easily spend as much on the lower Waitaki.
- There might be some more spent from the Aquatic Unit Nga Awa budgets on the lower Waitaki – I'm just waiting to hear back from Rosemary Millar on this.

Thanks,
Nicki

From: Ken Hughey <khughey@doc.govt.nz>
Sent: Friday, 8 April 2022 2:20 pm
To: Richard Maloney <rmaloney@doc.govt.nz>; Colin O'Donnell <CODONNELL@doc.govt.nz>; Herb Familton <hfamilton@doc.govt.nz>; Jo Macpherson <jmacpherson@doc.govt.nz>; Dean Nelson <dnelson@doc.govt.nz>; Nicki Atkinson <natinson@doc.govt.nz>
Subject: Update on today's negotiation mtg with the generators

Dear all

Another good meeting with the generators today. Key points:

1. A couple of things to edit in the overall 'picture' document – mostly minor so looking good. We have had the thumbs up from Mike Slater for this internally. They have a little more work to do but are confident its close. So, well done.
2. There were two outstanding, but manageable, questions:
 - a. Native fish passage between the upper and lower catchment. There is an issue here that I need to test – I am not going to detail the 'genesis' of the issue as it is sensitive. Essentially the bottom line is that the species of importance to provide passage for is tuna/long finned eel and trap and carry works. They are not keen on anything else for a variety of reasons. I will need to talk to our freshwater fisheries people about this and have promised to do so by next meeting which is 13 April!
Nicki – who is key in this space as I need to get onto this?
 - b. Programme governance – Jo and I are working on this.
3. We had a good chat about the draft/prototype Lower Waitaki scenario/option spreadsheet:
 - a. They liked the approach (but not a bit of the language – I will work on that!) and understand how it could be negotiated around. Interestingly they thought scenario 3 would meet consenting requirements but want to do better than that – whew! They want to see the costs and I will provide by Tuesday. I think **Richard it would be good if we could estimate what DOC is doing** and add that as there must be work in

the lower catchment, including overheads. I would appreciate just a rough estimate – given it is a nga awa river then this should help? Funnily enough, after I raised it yesterday in the technical group they raised black backed gulls (knowing it's a taonga species in the Ngai Tahu Treaty Settlement Act) – we had a good chat about this.

- b. We talked about how many of these we would prepare and to continue the house analogy, how many rooms are in the completed house (the big picture). I suggested 4 maybe 5. Ultimately if you think about the 'picture' that we have painted at a high level this is a picture of the house but without all of the rooms being built. We are now designing and adding rooms – together they make a completed house and we have to really understand the details around the house and if any rooms are more important than others etc.
- c. We agreed the next room we should populate is for the Tekapo catchment as I signalled last week. How long will it take to prepare and present to the generators, but first via our internal working group? Richard, would you do that? You may have course have done it?

I think that was it. It was an open and honest meeting and they are incredibly thankful for our work.

Jo – I think that is it?

Thanks Ken

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From: [Richard Maloney](#)
To: [Ken Hughey](#); [Jo Macpherson](#); [Colin O'Donnell](#); [Nicki Atkinson](#)
Subject: Draft Scenarios for levels of value management Tekapo system.xlsx
Date: Tuesday, 12 April 2022 8:27:05 am
Attachments: [Draft Scenarios for levels of value management Tekapo system.xlsx](#)
Importance: High

Morena Ken and Jo

Here's a first go at the Tekapo system values and scenarios. Some notes:

1. I've only described the Tekapo River, not the Lake levels, The values lost under the lake, lake water table impacts, delta impacts -that should be a different parallel doco
2. Only the two green tabs – haven't finished the costings yet – sorry. I will base the costs on Lewis doco she did for the land transfer, which came from Lewis and Maloney with some updates. She took an additive action approach to mgmt in that doco so not useful (ie do current weeds, then add predators, then add restoration of other stuff)
3. I've followed the LWaitaki approach of proportional scenarios, but with a few differences. Note that they read very similar because the size of the two river braid plains and length is actually very similar.

The description text is fairly long now – may be better as bullets (what is the point of this text?? I use the treatment tab info when I want to compare differences)). I haven't had a chance to proof this – so would pay for someone to match up the description text against the treatment tab.

Cheers

Richard

Situation: Raised lake levels have inundated large areas of wetland, braided river and other habitats. Modified lake fluctuations change the dynamics of water tables and impact on lake edge habitats. River flow dynamics over the full length of the Tekapo River
 Values: Many braided bird and freshwater fish values still present, but depleted and under threat. Native lizard, freshwater fish, bird and plant values known, but fine-scale distributions and populations trends poorly understood. Terrestrial invertebrate values
 Length and areas: The Tekapo River is ~48km in length and >5000 ha in area.

Scenarios	Scenario 1: High levels of values protected at ecologically meaningful scales	Scenario 2: Moderate protection of values in limited areas	Scenario 3: Do minimal levels of protection
Key actions	Scenario 1 key actions The full 48km length of the Tekapo River is managed. Remove woody and herbaceous weeds from all islands and active channel areas along the full river length. Remove all woody weeds from the wider braid plain in the Upper river, above the gorge. Remove woody weeds from the True Right of lower river to reconnect braid plain and PCL with the riverbed. Leave willows on True left bank of lower river where needed for flood protection. Provide 10 cleared islands to immediately secure threatened species. Add predator control in cleared areas because river flows no longer large enough (>6 cumecs per channel) to provide mammal predator security. Recover half of all available remnant seepages and wetlands adjacent to the river, including replacement of exotic trees with native vegetation around spring feed seepages (Pukaki ponds, Upper Tekapo seepages). Provide adequate off-site habitat management at 10 sites to protect native freshwater fish values that cannot be protected in situ including in some areas feeding into nearby side streams. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management (e.g., how to control monkey musk) and act on all key findings. Manage weed pressures which are exacerbated by low and controlled flows. Islands with small flows are accessible to vehicles, so actively work towards prevention of disturbance.	Scenario 2 key actions Establish and maintain 10 islands and 5 x 5km sections of braid plain (50% of available braid plain), so that threatened bird and invertebrate populations are secured. Recover 80% of all available remnant seepages and wetlands adjacent to the river and provide some fish protection at 8 sites in nearby side streams. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management and act on key findings. At restored sites, manage weed and predator pressures.	Scenario 3 key actions Establish and maintain 10 islands and a total of 5 km of braid plain (10% of available braid plain), so that threatened bird and invertebrate populations are present. Recover half of all available remnant seepages and wetlands adjacent to the river and provide some fish protection at 5 sites in nearby side streams. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management and act on key findings. At restored sites, manage weed and predator pressures.
What management looks like	Threatened taxa are recovered and thriving. Large areas of the affected braid plain and associated wetlands are re-established and are managed to provide habitat. Gaps in knowledge for taxa and pressures are filled and acted on. Management costs are reduced as source of weeds decreases and with economies of scale.	Most threatened taxa are recovered. Exemplar areas of the braid plain and wetlands are managed. Gaps in knowledge for taxa and pressures are filled, and key gaps are acted on.	Populations retained for some taxa, others unmanaged. Small patches of wetland and river habitat managed. Limited improvement in knowledge of taxa and pressures, and this translates to management for significant findings.
Focus detail	Adaptive approaches are used. Focus is on management of all braided river species in the braid plain and water. Islands around 1-10 ha created every 2km along the length of the river (at 10 ha this is 1.2% of land area cleared), and these islands are eventually subsumed under clearance of the active channel areas. The active channel is managed and cleared at 5km per year for 10 years to achieve 100% of river length, then is managed at this level. Use of spill flood flows to help with weed management is understood. Research into terrestrial invertebrate and lizard fauna distribution and diversity, and management needs, and into better management techniques for freshwater fish populations is carried out, and all key findings are implemented. Management of threatened fish populations occurs in nearby side streams to replace seepage habitats no longer present/recoverable in the Tekapo mainstem.	Adaptive approaches are used. Focus is on management of all braided river species in the braid plain, and on freshwater fish habitats in the wetland areas. Ten islands around 1 ha+ created every 4km along the length of the river (0.25% of land area cleared), and the braid plain is managed and cleared in 5 x 5 km sections of the river (50% of river length). Managed areas are maintained with predator and weed control. Use of spill flood flows to help with weed management is understood. Research into terrestrial invertebrate and lizard fauna distribution and diversity, and management needs, and into better management techniques for freshwater fish populations is carried out, and all key findings are implemented. Management of threatened fish populations occurs outside the Lower Waitaki to replace side stream habitats no longer recoverable.	Adaptive approaches are used. Focus is on management of black-fronted terns, kākī and banded dotterels in the braid plain, and on freshwater fish habitat in seepage areas. ~10 islands of at least 1 ha are created and managed (0.2 % of land area). Only short sections of the braid plain is cleared and managed (10% of river length). Managed areas are maintained with predator and weed control. Use of spill flood flows to help with weed management is understood. Research into terrestrial invertebrate and lizard fauna distribution, diversity and management needs, and into better management techniques for freshwater fish populations is carried out.
Management activities types	Island and bank area bulldozing and tractor raking, and other weed removal and followup management techniques (e.g., herbicides). The best use of spill flows (e.g., during outages or high lake levels/inflows) to enhance habitat and remove weeds is investigated. Willow and other woody weed clearance from wetlands and restorative wetland planting. Additional enhancement of braided river values by tweaking activities around flood control works. Targetted invertebrate and lizard sampling in a range of habitats across the full length of the site, with further actions adopted once results known. Weir building and trout removal in smaller nearby streams and seepages to benefit threatened fish. Freshwater fish populations protected and recovering at these sites.	Island bulldozing and tractor raking and other weed removal and followup management techniques, willow clearance from wetlands and restorative wetland planting. Targetted predator and weed control to cleared areas. Targetted invertebrate and lizard sampling in a range of habitats across the full length of the site, with further actions adopted once results known. Weir building and trout removal in smaller streams and seepages to benefit threatened fish. T	Island bulldozing, tractor root raking, willow clearance from wetlands and some restorative wetland planting. Limited weed and predator management. Targetted invertebrate and lizard sampling in a range of habitats across the full length of the site.
Management by others	woody weed management continues and is eventually superceded by the braid plain clearance work. Any flood control works and e.g., protection of the iron bridge continues.	Meridian fairway clearance across the rest of the site, and flood control works continue. DOC Nga awa programme continues, and includes wider land use impacts on the freshwater system.	Meridian fairway clearance and flood control works continue. DOC Nga awa programme continues, and includes wider land use impacts on the freshwater system.

Scenarios to achieve different levels of protection of ecological outcomes in the Tekapo River. Note that higher level scenarios that would achieve additional outcomes through activities such as the partial or full restoration of natural flood flows and re-establishment of sediment movement regimes are not included here.

Tekapo River Activities	Calculations	Scenario 1: High levels of values protected at ecologically meaningful scales	Scenario 2: Moderate protection of values in limited areas	Scenario 3: Do minimal levels of protection
Islands creation	At 1 ha each	10 initial islands	10 islands	10 islands
Islands replacement	At full replacement every 10 years (10% per annum)	not needed	1 island replaced per annum	1 island replaced per annum
Braid plain clearance	at 50-100 ha per km (48 km)	48 km braid plain cleared	25 km braid plain cleared	5 km braid plain cleared
Weed maintenance - cleared areas	At islands + braid plain in ha at 30% of habitat area created	~4000 ha area in riverbed (1200 ha weed mgmt)	~2000 ha area created (600 ha of weed mgmt)	~400 ha area created (120 ha of weed mgmt)
Small mammal predator mgmt at cleared areas	At islands + braid plain in ha	48 km islands and bank areas	25 km islands and bank areas	5 km islands and bank areas
Black backed gull predator control	At colonies	100% estimated at 3 colonies	100% estimated at 3 colonies	100% estimated at 3 colonies
Wetlands cleared	At 1 wetland seepage area per 1 km 48 per side 96 in total At 1ha per wetland 96 ha	100% 100 ha of wetlands	80% 80 ha of wetlands	50% 50 ha of wetlands
Wetlands restored planting, fencing	At 1 wetland seepage area per 1 km 48 per side 96 in total At 1ha per wetland 96 ha	100% 1000 plants	80% 800 plants	50% 500 plants
Offsite native fish protection using weirs and pest fish removal	At \$31300 average annual cost per weir including pest removal, and replacement costs. Offset lost sidestream water table habitat at 1 weir per 5km of river length equivalent 10 weirs	100% 10 weirs built, maintained and pest fish removed	80% 8 weirs built, maintained and pest fish removed	50% 4 weirs built, maintained and pest fish removed
Knowledge gaps filled	At \$30k each per annum for 3 years for lizards and fish, and \$80k per annum for invertebrates on land for 5 years (includes sorting and referencing costs).	Distribution and diversity of lizards, terrestrial invertebrates, fish identified	Distribution and diversity of lizards, terrestrial invertebrates, fish identified	Distribution and diversity of lizards, terrestrial invertebrates, fish identified
Application of key findings from knowledge gaps	Nominally at \$100k each for lizards, fish and terr inverts from year 6.	All (100%) of key recommendations taken up	Most (80%) of recommendations taken up	Highest priority (50%) of recommendations taken up

Key actions	Calculations	Scenario 3 key actions Establish and maintain the braid plain at a rate of 2 km per annum over 24 years to achieve 100% of available braid plain. Provide island cover 1.2% of land area immediately to secure threatened species. Recover all key wetlands and side streams as part of a connected braid plain, and further provide adequate off-site habitat management to protect native freshwater fish values that cannot be protected in situ. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management and act on key findings, including finding solutions to barriers to migration. Manage weed and predator pressures which are exacerbated by low and controlled flows.	Scenario 2 key actions Establish and maintain 30 islands and 3 x 5km sections of braid plain (24% of available braid plain), so that threatened bird populations are secured. Recover most key wetlands and side streams. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management and act on key findings. At restored sites, manage weed and predator pressures which are exacerbated by low and controlled flows.	Scenario 1 key actions Establish and maintain 15 islands and 4 x 2km sections of exemplar braid plain, including weed and predator control. Recover key wetlands and side streams. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management.
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	Scenario 1: High levels of values protected at ecologically meaningful scales	Scenario 2: Moderate protection of values in limited areas	Scenario 3: Do minimal levels of protection			
	Scenario 1	Scenario 2	Scenario 3	Task	Set-up	Ongoing
Current	5x's current effort	3x's current effort	current effort	Weed control: Upper Tekapo River	\$120,000	\$120,000
Current	5x's current effort	3x's current effort	current effort	Weed control: Below gates	\$3,000	\$3,000
Current	8x's current effort	5x's current effort	current effort	Southern black-backed gull control	\$4,150	\$4,150
Restoration	48 km trapped	24 km trapped	5 km trapped around island	Cats and possums	\$63,700	\$33,700
Restoration	48 km trapped	24 km trapped	5 km trapped around island	Ferrets	\$113,725	\$34,385
Restoration	48 km trapped	24 km trapped	5 km trapped around island	Stoats, hedgehogs, rats	\$103,615	\$34,385
Restoration	All banks in lower 15km clear	Banks in lower 5 km clearer	No banks in lower river clear	Clearing banks	\$199,000	\$222,800
Restoration	yes	yes	yes	Stock fencing	\$20,000	\$1,900
Restoration	yes	yes	yes	Minimising disturbance	\$18,900	\$10,500
Full restoration	3 fenced areas	1 fenced area	no fenced areas	Predator fences	\$779,700	\$94,700
Full restoration	5 spp	3 spp	1 spp	Translocations for biodiversity	\$7,200	\$2,100
Full restoration	5 spp	3 spp	1 spp	Climate change translocation	\$15,000	\$10,000
Full restoration	5 spp	3 spp	1 spp	Plant translocations	\$2,700	\$2,300
Full restoration	5 wetlands created	3 wetlands created	1 wetland created	Wetland creation	\$37,200	\$2,400
Full restoration	80% (60ha)	50% (37ha)	20% (15ha)	Clearing islands	\$26,600	\$25,600
Full restoration	in 3 fenced areas	in 1 fenced area	in no fenced areas	Mice control	\$14,900	\$20,100
Full restoration	yes	yes	yes	Southern black-backed gulls	\$35,100	\$35,100
Full restoration	yes	yes	yes	Lagomorph control	\$63,200	\$6,200
Full restoration	5 weirs built	3 weirs built	no weirs built	Predatory fish	\$31,100	\$4,100
Full restoration	All side streams controlled	50% of side streams contro	30% of side streams contro	Aquatic weed control	\$5,000	\$5,000
					\$1,017,700	\$207,600

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Key act ons
Calculat ons
Costs
Scena o 1 key act ons. Establ sh and ma nta n the b a d pla n at a ate of 2.5km pe annum ove 24 yea s to ach eve 100% of ava lable b a d pla n. P ov de slands ove 1.2% of land a ea mmed ately to secu e th eatened spec es. Recove all key wetlands and s de st eams as pa t of a connected Scena o 2 key act ons. Establ sh and ma nta n 30 slands and 5 x 5km sect ons of b a d pla n (40% of ava lable b a d pla n), so that th eatened b d populat ons a e secu ed. Recove most key wetlands and s de st eams. F l knowledge gaps n l a ds and te est al nve teb ates, and n nat ve f sh Scena o 3 key act ons. Establ sh and ma nta n 15 slands and 4 x 2km sect ons of exmpla b a d pla n, nclud ng weed and p edato cont ol. Recove key wetlands and s de st eams. F l knowledge gaps n l a ds and te est al nve teb ates, and n nat ve f sh management.

Islands c eat on	Islands eplacement At full eplacement eve y 10 yea s (10% pe annum)	B a d pla n clea ance at 77ha pe km (4800ha land a ea/62km)	Weed ma ntenance - clea ed a eas	Small mammal p edato mgmt at clea ed a eas	Black backed gull p edato cont ol	Wetlands clea ed At 1 wetland pe 5 kms = 12 pe s de = 24 n total At 10ha pe wetland	Wetlands esto ed plant ng At 1 wetland pe 5 kms annual pe plant \$31300	Offs te nat ve f sh p otect on At \$31300	Knowledge gaps filled At \$30k each pe annum fo 3 yea s fo l a ds	Appl cat on of key nat ve f sh find ngs f om knowledge gaps Nom nally at \$100k each fo l a ds, f sh and te nve ts
At 1 ha each			At slands b a d pla n n ha	At slands b a d pla n n ha At 30% of hab tat a ea c eated pe annum. At 200m spac ng = 9 t aps pe 16ha. At 55 pe t ap ma ntenance pe fo tn ght. At \$120 pe t ap ave age pu chase eve y 15 yea s.	At colon es					
At \$3000 pe ha c eat on	At \$3000 pe ha e- c eat on pe annum	At \$3000 pe ha c eat on	At 30% of hab tat a ea c eated pe annum = \$50 pe ha		At \$30,000 pe colony pe yea fo 5 yea s. Est mated 10 colon es.	At \$3000 pe ha clea ed	100% = 24 = 240 ha = 2400 plants 80% = 19 = 190 ha = 1900 plants 50% = 12 = 120 ha = 1200 plants	100% = 31 f sh te est al nve teb ates, f sh l a ds, te est al nve teb ates, f sh l a ds, te est al nve teb ates, f sh		
60 ha	6	62km	1492.2	1492.2	100% = 10	100% = 24 = 240 ha				\$300,000
30	3	25km	586.5	586.5	80% = 8	80% = 19 = 190 ha				\$300,000
15	1.5	8km	199.8	199.8	50% = 5	50% = 12 = 120 ha				\$300,000

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Tekapo Activities and 35 year sum costs	Scenario 1: <i>High levels of values protected at ecologically meaningful scales</i>	Scenario 2: <i>Moderate protection of values in limited areas</i>	Scenario 3: <i>Do minimal levels of protection</i>
Island creation	\$180,000	\$90,000	\$45,000
Island replacement	\$63,000	\$31,500	\$15,750
Braid plain clearance	\$14 322 000	\$5 775 000	\$1 848 000
Weed maintenance - cleared areas	\$2,537,850	\$1,026,400	\$331,300
Small mammal predator mgmt at cleared areas	\$3 973 850	\$1 619 370	\$532 700
Black backed gull predator control	\$1,500,000	\$1,200,000	\$750,000
Wetlands cleared	\$720,000	\$570,000	\$360,000
Wetlands restored planting, fencing	\$360 000	\$285 000	\$180 000
Offsite native fish protection using weirs and pest fish removal	\$970,300	\$782,500	\$469,500
Knowledge gaps filled	\$580,000	\$580,000	\$580,000
Application of key findings from knowledge gaps	\$300,000	\$240,000	\$150,000
TOTAL per SCENARIO over 35 years	\$25,507,000	\$12,199,770	\$5,262,250
TOTAL per SCENARIO annual average*	\$728,771	\$348,565	\$150,350

*there are generally higher costs in years 1-10

Key actions	Scenario 3 key actions: Establish and maintain the braid plain at a rate of 2.5km per annum over 24 years to achieve 100% of available braid plain. Provide islands over 1.2% of land area immediately to secure threatened species. Recover all key wetlands and side streams as part of a connected braid plain, and further provide adequate off-site habitat management to protect native freshwater fish values that cannot be protected in situ. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management and act on key findings, including finding solutions to barriers to migration. Manage weed and predator pressures which are exacerbated by low and controlled flows.	Scenario 2 key actions: Establish and maintain 30 islands and 5 x 5km sections of braid plain (40% of available braid plain), so that threatened bird populations are secured. Recover most key wetlands and side streams. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management and act on key findings. At restored sites, manage weed and predator pressures which are exacerbated by low and controlled flows.	Scenario 3 key actions: Establish and maintain 15 islands and 4 x 2km sections of exemplar braid plain, including weed and predator control. Recover key wetlands and side streams. Fill knowledge gaps in lizards and terrestrial invertebrates, and in native fish management.
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From: [Jo Macpherson](#)
To: [Richard Maloney](#); [Colin O'Donnell](#); [Dean Nelson](#)
Cc: [Ken Hughey](#)
Subject: Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 (002)
Date: Monday, 4 April 2022 1:01:41 pm
Attachments: [Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4 \(002\).docx](#)

Kia ora team

Here is the latest tidy version. Any comment please send back to Ken and I before 10-00am tomorrow morning (Tuesday). Ken and I are meeting at 11am to go through any comments, before sending back to the Generators about mid-day tomorrow.

Thanks JO

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From: [Jo Macpherson](#)
To: [Ken Hughey](#)
Subject: Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4
Date: Monday, 4 April 2022 9:40:14 am
Attachments: [Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 4.docx](#)

Ken, here is a clean version, but you can show track changes by clicking 'Review' and then 'show mark-up' and ticking "comments" and "insertions and deletions".

I like the changes you made, but just printed off the clean version so will have a fresh read now.

There were some unresolved aspects during the meeting which I can point out, but need the track changes chowing .

Cheers JO

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From: [Jo Macpherson](#)
To: [Ken Hughey](#)
Subject: Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 3
Date: Friday, 1 April 2022 10:29:04 am
Attachments: [Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 3.docx](#)

Hi Ken

Here is the latest document, I have tidied a bit up already, but still a few bits which do need some work. Im hesitant to take all track changes off just yet.

We are meeting at 10-00am on Monday with the internal group, so catch up then. Or let me know if you want to meet earlier than 10-00.

out of scope

[REDACTED]

[REDACTED]

Cheers JO

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From: [Jo Macpherson](#)
To: [Ken Hughey](#)
Subject: High level proposition
Date: Thursday, 31 March 2022 12:09:53 pm
Attachments: [Initial DOC picture of a biodiversity rich Waitaki - DOC-6954880_Generators Version 3.docx](#)

Here you go Ken – the document is revised and ready for a fresh look.

It corrupted on my while I was working on it, but help desk to the rescue.. thanks goodness.

Cheers JO

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o-o-s - sent to generators

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